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**Fiscal Oversight of the Budget for Defense Research,
Development, Test and Evaluation, Fiscal Years 1983-1992**

by

**Gregory William Eaton
Lieutenant Commander, United States Navy
B.S., Western Michigan University, 1980**

Submitted in partial fulfillment of the requirements for
the degree of

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from the

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ABSTRACT

This thesis examines the importance of the defense Research, Development, Test and Evaluation (RDT&E) budget. The relevance and value of the budget are addressed. The composition and size of the RDT&E budget as a share of the defense and investment budgets over time are evaluated. The origin of congressional oversight and the development of Department of Defense RDT&E budget formats are explained. The defense, procurement, and RDT&E budgets are examined from Presidential request through the appropriation over a ten year period. Analysis includes the authorization and appropriation changes to the budget, as well as the House and Senate impact on the three budgets. Five major conclusions were drawn. First, the period between FY 1983 and FY 1988 saw significantly greater conflict between Congress and the executive branch over priorities regarding the defense budget. Second, the budget reductions were smaller during the FY 1989 to FY 1992 period due to greater cooperation between the President and Congress and between the two houses of Congress. Third, the Senate is more supportive of RDT&E spending than is the House. Fourth, the appropriation for procurement was funded more than the presidential request three of the four years during the FY 1989 to FY 1992 period. Fifth, the RDT&E budget receives the greatest relative reductions from both the authorization and appropriation committees.

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I. INTRODUCTION

This chapter will address the objective of the thesis. It describes the research questions, the scope, limitations and assumptions, methodology and organization of the chapters.

A. OBJECTIVES.

The objective of the thesis is to identify the trends of the defense Research Development, Test and Evaluation (RDT&E) budget. These trends are explored by examining the President's request and the congressional response, that is, the funding levels approved during the authorizing and appropriating cycles of the congressional budget process. This information is germane to theories concerning congressional incentives and focuses on an area of the defense budget that has not been examined and is becoming more politically salient.

B. THE RESEARCH QUESTIONS.

The following research questions are addressed:

1. Has the RDT&E budget as a share of investment spending changed over the past decade?
2. What changes are being made to the defense RDT&E budget and where in the congressional defense budget process are the changes being made?
3. Has the level of congressional intervention in the defense RDT&E budget changed in the past ten years?

4. Is there a difference between House and Senate intervention in the defense RDT&E budget?

C. SCOPE, LIMITATIONS AND ASSUMPTIONS.

This thesis will be an examination of fiscal oversight including both what is being changed in the administration's proposed RDT&E budget and where in the congressional budget process these changes are being made. The study will be limited to the ten years of budget requests between FY 1983 and 1992.

Also, this thesis will address the RDT&E budget as a share of the investment budget and its share of the total defense budget. The changes in these relationships are important and interesting in the examination of RDT&E within congressional fiscal policy constraints.

The investment budget is normally referred to as procurement, RDT&E and military construction. For purposes of this thesis, the investment budget will include only procurement and RDT&E. MILCON is omitted because the purpose of this thesis is the technology policy implications of fiscal oversight. Moreover, MILCON is not applicable to technology policy.

D. METHODOLOGY.

This thesis will examine the scope and nature of congressional changes to the administration's budget request for RDT&E. Data from the Department of Defense Comptroller's Office is used which displays ten years of adjustments to the budget request made by authorizing and appropriating committees of the House and Senate, as well as the final conference agreement. Adjustments are shown in dollar terms at various levels of aggregation, from budget category to program element. This information provides answers

to the research questions surrounding fiscal oversight and budgetary control of defense spending for research, development, test and evaluation.

The analysis of the data affecting the RDT&E budget as a share of the investment budget encompasses the period between FY 1981 and FY 1993. This period begins with the Carter/Reagan defense buildup and ends with the present. Budget authority measured in current dollars is used for evaluation purposes.

The data addressing congressional oversight include the ten years from FY 1983 to FY 1992. Total obligational authority rather than budget authority was used in the congressional oversight sections. The difference between budget authority and total obligational authority is minimal, averaging less than 0.3 percent for defense and virtually no difference for procurement and RDT&E. Total obligational authority was used instead of budget authority in this section because the data base for congressional action on the RDT&E budget was provided in that form.

E. ORGANIZATION OF STUDY.

Chapter II, "Importance of the RDT&E Budget," will address the background of the defense RDT&E budget. The direction and strategy of DoD, the value of what is purchased and the significance of the RDT&E budget in relation to the total budget and its relationship to the U.S. industrial/technology base are addressed.

Chapter III, "The RDT&E Budget: Composition, Size, and Share of the Investment Budget," explains the elements of the RDT&E budget. The size of the budget, its relationship to O&M, procurement and the investment budget will be examined. This chapter also examines the dimensions of the RDT&E budget from FY 1981, the beginning of the defense buildup, to FY 1993.

Chapter IV, "Congressional Oversight of the RDT&E Budget," will address congressional oversight responsibilities and the RDT&E budget. The origin of the oversight process is described, and the committees with oversight responsibility are identified. Additionally, the format of the RDT&E budget is explained. Congress's interest in the RDT&E portion of the budget and how this interest has increased in recent years will be reviewed.

Chapter V, "The Scope of Congressional Intervention in the RDT&E Budget," will examine how much defense RDT&E has been changed by Congress over the past ten years. For this purpose, RDT&E budgets are compared with the total defense budget and the procurement budget. The President's request through the congressional authorization and appropriation cycles of the budget process is addressed.

Chapter VI, "Congress and the RDT&E Budget: Differences between the House and Senate," will determine where the changes in the RDT&E budget are made within the Congress. The purpose of this chapter is to identify differences between the House and Senate and among the several stages of the budget process in terms of adjustments to the RDT&E budgets submitted by Presidents.

Chapter VII, "Conclusions," will summarize the findings of the analysis in previous chapters. Trends will be identified, implications drawn and suggestions for further study are offered.

II. THE IMPORTANCE OF THE RDT&E BUDGET

Budgets for defense science and technology, funded in the Research, Development, Test and Evaluation (RDT&E) portion of the defense authorization and appropriation bills, are in a state of flux. They have been changing significantly, both in size and in content over the past decade. The Department of Defense's 1992 Future Years Defense Plan (FYDP) promises further modifications between 1992 and 1996. The changes witnessed during the 1980's are the consequence of the rise and fall of the defense budget during the decade as well as the interplay of policy differences between the executive branch and Congress.

In appropriating funds for defense science and technology, Congress has adjusted the priorities established by the Department of Defense reflected in the Department's budget request for RDT&E. The adjustments made by Congress are driven by a number of factors, including policy considerations affecting force structure, military doctrine, the defense industrial base, acquisition strategy and increasingly, the civilian economy. The premise of this thesis is that more attention will be paid to spending for defense research and development in the near future because it has become a larger proportion of the defense investment budget and because issues associated with spending for science and technology have become more important to members of Congress.

A. INTRODUCTION.

The RDT&E budget, combined with the larger procurement budget, represents what is commonly referred to as the investment portion of the defense budget. Investment budgets are significant for two reasons. First, they represent a significant share of the defense budget as a whole. In FY 1992, DoD spent \$97.5 billion dollars for RDT&E and

Procurement, or more than a third of the \$276.3 billion appropriated for the Department of Defense. [Ref. 1:p. 78] The share of the defense budget allocated for RDT&E alone has been expanding each year in relation to the total defense budget. For FY 1992, the RDT&E budget was 13.4 percent of the total defense budget, as compared to 12.4 percent in FY 1990. [Ref. 1:p. 78]

The relationship between the RDT&E and procurement components of defense investment spending has been shifting over the period of the 1980's, and it is expected to continue to change in the 1990's. Evidence of this shift can be found by examining changes in the ratio of spending between RDT&E and Procurement. In 1981, RDT&E spending was 34 percent of procurement, or approximately one third as large. A decade later, it was 50 percent. This implies that each dollar allocated by DoD and the services to RDT&E is leveraging fewer dollars for procurement. It also suggests that members of Congress seeking to influence defense investment policy may increasingly do so through the RDT&E budget.

Second, investment budgets are also important because of their implications for the defense industrial base and the competitiveness of American industry. The investment budget represents the scientific, technical and economic potential of the defense industrial base. This defense industrial base is a vital part of the domestic economy. It provides employment and growth and enhances U.S. competitiveness in the world. The RDT&E portion of the investment budget enhances U.S. competitiveness through research at government labs, private firms and universities. This includes DoD funding for training for the nation's future scientists and engineers. [Ref. 2:p. 33-34, 48]

The RDT&E budget invites congressional intervention for four main reasons. First, the sheer size of investment spending invites congressional intervention. For FY 1991, for example, spending for RDT&E and Procurement was \$107.9 billion. This appropriation is larger than every other non-defense function in the federal budget except for income

security (unemployment insurance), social security, interest on the national debt and commerce and housing credit. [Ref. 1:p. 10] The fact that defense spending is discretionary, while these other programs are mandatory, helps explain the attention given by Congress to the annual defense budget proposal.

Second, the RDT&E budget is presented in a format that makes modification relatively easy to Congress. The President's budget for Procurement is summarized in the P-1, a list of all items to be purchased for DoD in each fiscal year, at the program element and line item level. The R-1 summarizes all RDT&E purchases at the same level of detail. Accordingly, Congress authorizes and appropriates for procurement and RDT&E in the same manner.

The disaggregation of the investment accounts invites committees and subcommittees, as well as individual members of Congress to reconfigure DoD programs during the process of fiscal oversight. The remainder of the defense budget, with the exception of Military Construction, a relatively small portion of the total defense budget, is neither requested nor approved in this line item/program element format.

Third, defense investment spending has great symbolic value and, thus, is more politically salient. For many members of Congress, the media and the interested public, the budgets for RDT&E and Procurement symbolize technological superiority and force modernization. This is an area of potential conflict involving both foreign and domestic economic policy between the political parties and, during periods of divided government, between Congress and the President.

Fourth, there is growing evidence of a conflict between Congress and the executive branch of government over the domestic economic policy implications of defense investment budgets. This conflict involves different visions of the links between defense technology and the industrial base and the American economy. Many in Congress would have the Department allocate a larger share of defense RDT&E spending to purposes which

extend beyond national security narrowly defined. These dollars, according to this view, should not only produce superior defense technology, they should also contribute to the competitiveness of civilian manufacturing technology. Proposals to adopt dual-use technologies for defense are examples of this approach. [Ref. 3:p. 1-19]

The defense RDT&E budget has increasingly become the arena for disputes involving both defense and non-defense policy issues. Congressional fiscal oversight of this budget will be the venue for these disputes. We know from other studies of congressional behavior that Congress rarely operates as a monolith. [Refs. 4:p. 7-42 and 5:p. 32-44, 64-74] That is, sub-elements of the Congress--individual members, committees, parties or separate chambers--operate differently depending upon the context. It is expected that these same differences will obtain as regards fiscal oversight of the defense RDT&E budget. It is important for students of Congress and defense policy to understand which of these sub-elements have been most active in the area of defense RDT&E, and how they have used their fiscal oversight authority. Data on fiscal oversight of defense RDT&E budgets will provide some empirical evidence bearing on these questions.

B. DEPARTMENT OF DEFENSE INVESTMENT STRATEGY.

1. Official Strategy.

The President announced a shift in defense strategy from the Cold War posture in his remarks to the Aspen Institute on August 2, 1990. [Ref. 6:p. 4-6] These remarks altered the defense strategy to one of regional defense. The regional defense strategy emphasizes technological superiority, rapid response and readiness. The emphasis on technological superiority is to ensure that the U.S. has the future capability to respond rapidly and successfully to national security threats. The objective of technological superiority is achieved through effective RDT&E. The President focused on "an active and

inventive program of defense RDT&E" in his remarks. He stressed the need to maintain the "technological edge to offset the need to match potential adversaries' strength in numbers." [Ref. 6:p. 4] Additionally, he addressed the importance of RDT&E to ensure that capable military forces are available for the President's use beyond the year 2000.

The President further delineated the defense RDT&E strategy in his 1992 State of the Union Speech before Congress. [Ref. 7:p. 264-266] The President canceled procurement programs and reduced procurement quantities signifying the shift in acquisition strategy to prototyping and low rate production. The revised acquisition strategy strives for development of a wide spectrum of new defense technologies while funding only the most capable systems for production. As a result of this strategy, far fewer systems will progress to full scale production. This will greatly affect the profitability of the defense industry, as RDT&E profits historically have been recouped during production.

The Secretary of Defense echoed the President's remarks during testimony before the House Budget Committee on February 5, 1992. The Secretary addressed the old acquisition strategy of "rapid development and procurement of new systems to counter rapidly evolving Soviet capabilities." [Ref. 8:p. 27] The old strategy assumed that everything researched would eventually be produced. This often resulted in programs over budget, late and below specifications due to concurrent development to meet the rapid demands of the Department.

The revised strategy within the department will emphasize "government-supported RDT&E to maintain the technology base." [Ref. 8:p. 27] The focus of this revised RDT&E strategy has four segments. First, there will be additional emphasis on prototypes to demonstrate and prove new technology prior to production. Second, fewer projects will be funded for full scale production. Therefore, systems will be proven in concept and fully tested prior to production. Third, emphasis will be shifted from building

new systems with new capabilities to incorporating new capabilities into existing systems. Fourth, the Department will emphasize production efficiency of systems and the manufacturing process.

In order to make RDT&E more profitable for the defense industry, the Pentagon plans to move away from fixed price contracts where there is significant technological risk. "Fixed price contracts do not make sense in risky research and development programs and industry can no longer count on recouping its expenses during production as in the past," says Mr. Atwood. [Ref. 9:p. 12] This change in RDT&E funding will ease industry concerns as the Department shifts from the more profitable production runs. The Pentagon is also attempting to relax restrictions on the marketing of defense-related technologies and to move science and technology into a more central role in the acquisition process. Again, these measures are aimed at increased profitability for RDT&E within the defense industry.

2. Preservation of the Technology Base.

The defense industrial base is going through some major adjustments in light of the declining defense procurement budget. The Department knows, understands and expects there will be some down sizing, streamlining and divesting of excess capacity as the defense industrial base reacts to the current budget situation. In order to best handle these changes, the Department of Defense has established four objectives in its defense industrial base policy. [Ref. 10:p. 3] First, the defense industrial base must support the base force structure in peacetime. Second, it must be capable of supporting planned contingency-related needs. Third, the industrial base must be able to increase production capacity faster than any newly emerging global threat can increase its capacity. Fourth, it must be cost effective and efficient.

These objectives will not preserve the industrial base in its current state. The Department is expecting a smaller, more efficient industrial base, one better sized to meet reduced defense needs through a market adjustment period. The Department has

established four steps to meet future industrial base needs. [Ref. 11:p. 2-8] First, the Department will continue to invest a significant amount of funds to procure cost effective, producible and necessary systems to maintain the superiority of U.S. weapon systems. Although procurement funds are declining, the Department of Defense is planning on spending \$60.5 billion for procurement in FY 1992 budget authority, or 25 percent of the total DoD budget. [Ref. 1:p. 78]

Second, the Department will continue to develop new and innovative manufacturing technology to improve production efficiency. This initiative will examine new technology for time, cost and production efficiency in hardware/software prototyping, flexible production capabilities and advanced manufacturing processes.

Third, the Department will establish a defense industrial base oversight process which will identify critical processes, products or capabilities, and monitor changes occurring in the industrial base. Additionally, the oversight process will obtain early warning of the potential loss of these critical items and take action to preserve a needed critical process, product or capability in those situations where it may be lost and cannot be replaced in time to meet an emerging threat. This initiative will ensure critical technology is maintained, even during production gaps.

Fourth, the Department will stimulate changes in the industrial base that will increase efficiency and competition. This initiative integrates commercial items for government use, if the item is already available in the market place, with government contractors. Additionally, it competes weapon system maintenance items within DoD and in the private sector.

C. THE VALUE OF THE RDT&E BUDGET.

1. Technical Superiority.

The regional defense strategy uses technological superiority as one of its main foundations, along with quality personnel, core competencies and robust alliances. [Ref. 8:p. 26-27] The rapid response required in the regional defense strategy requires a technological edge for a quick victory. The new strategy of regional defense will require a decisive outcome for both political and strategic considerations. "This decisive outcome requires a continuing emphasis on technological superiority," says Secretary Cheney. [Ref. 8:p. 27]

The Department's challenge for the \$37 billion dollars in the RDT&E budget for FY 1992 will be to maintain the advantage over the competition. The value of the \$37 billion in FY 1992 is in the aircraft flown in the Gulf War, the reliable command and control systems available to our commanders on a daily basis and the precision and stand-off weapons currently available. These are three key areas to which RDT&E contributed greatly during the decisive military victory in the Persian Gulf.

2. Next Generation Military Systems.

The RDT&E budget is the key to development of the systems required to keep our military forces on the technological edge to meet the President's regional defense strategy of rapid response and decisive actions. The Gulf War proved to be a testing ground for some of these systems such as stealth technology, cruise missiles, stand-off strike weapons and air defense missiles. The quick and decisive allied victory led by the U.S. demonstrated that Operation Desert Storm may be a model for some of the conflicts in the future.

Defense planners from the Office of the Director of Defense Research and Engineering have identified seven capabilities crucial to maintaining a strong defense in the future. [Ref. 12:p. 37] First, global surveillance is needed to provide warning and

ultimately mission planning and control through satellite systems. The Air Force and Navy are exploring communications, data fusion and, most importantly, information processing to support theater needs.

Second, precision strike weapons capable of penetrating foliage and any camouflage to strike mobile or fixed targets are needed to maintain an effective military force. Synthetic aperture surveillance radars and other target acquisition technology will be required day or night regardless of weather conditions. Additionally, low-observable platforms and smart stand-off weapons are critical to this area. An example of a next generation precision weapon is the tri-service standoff attack missile (TSSAM) which is a stealthy cruise missile that can be air or ground launched. The TSSAM has many warhead and guidance options which can be mixed and matched. [Ref. 13:p. 23-24]

Third, air superiority and air defense against cruise missiles and advanced aircraft are critical to future military strength. An all weather capability using different frequency radars and infrared sensors will form a network involving sea, land, space and air systems. Real time command and control, positive IFF and automated decision aids will be included in this system. Examples of next generation air superiority and air defense platforms are the F-22, multi-role fighter (F-16 replacement), advanced medium range air-to-air missile (AMRAAM) and Patriot multi-mode seeker modification.

Fourth, the Navy is evaluating platforms to provide sea control and undersea superiority. A full spectrum of acoustic and non acoustic sensors are being evaluated for use in these platforms. An example of a next generation sea control platform is the EX, the replacement for the aging E-2C.

Fifth, the Army is evaluating advanced land combat vehicles that are survivable and lethal in all weather, day or night. These advanced land combat vehicles would incorporate signature control, advanced armor and gun/missile systems technologies.

Sixth, training and readiness will be improved through computer and electronic technology. This technology on training ranges, training centers and schools will enhance training by providing more training opportunities and simulating combat conditions at lower costs.

Seventh, an improved acquisition process will integrate warfighting and training requirements with manufacturing and production technology. Reduced acquisition time at a lower cost is the objective.

D. DEFENSE RDT&E IN RELATION TO PRIVATE SECTOR SCIENCE AND TECHNOLOGY.

1. Public Defense Spending in Relation to Private Spending.

In FY 1991, federal spending for research and development accounts for 44 percent of all research and development spending in the U.S., which is estimated to be \$152 billion. The remaining 56 percent of spending for all research and development is made up by industry, academia, and nonprofit organizations. Total funding for research and development in the federal budget for FY 1991 was \$68 billion. Of this amount, \$36 billion was for defense. [Ref. 14:p. 1]

The relationship between government and private spending for RDT&E as well as the share of federal spending devoted to defense have changed over the past 30 years. These changes are noted in TABLE I. The government invested \$8.7 billion in research and development in FY 1960 [Ref. 15:p. 41], an investment that grew to \$66.7 billion in FY 1990 [Ref. 16:p. 94]. In FY 1960, 80 percent of government RDT&E spending was for defense [Ref. 15:p. 41], as compared to 56 percent in FY 1990 [Ref. 16:p. 94]. Private industry spending for research was \$4.5 billion in FY 1960 [Ref. 15:p. 41], as compared to \$78.3 billion in FY 1990 [Refs. 16:p. 94 and 17]. Total public and private research and development spending in FY 1990 is estimated at \$145 billion. [Ref. 17]

Comparing the FY 1960 figures to data for FY 1990, commercial research and development has increased by a factor of 12.78 while defense has increased by a factor of 5.11. Spending for commercial R&D has increased 2.5 times faster than spending for defense RDT&E. [Ref. 15:p. 41]

For FY 1993, the President requested \$75.7 billion for federal RDT&E. This total includes \$42.3 billion, or 56 percent for defense-related research. [Ref. 18:p. 1] Estimated public and private RDT&E spending for the U.S. for FY 1993 is \$155 billion. In the 1990's, private firms are now matching or exceeding total federal RDT&E spending, while doubling defense RDT&E spending efforts.

TABLE I
RDT&E PUBLIC AND PRIVATE SPENDING
(CURRENT DOLLARS IN MILLIONS)

	1960	1990	1993
Total RDT&E Spending	\$ 13,200	\$145,000	\$155,000
Government RDT&E Spending	\$ 8,700	\$ 66,700	\$ 75,700
Government RDT&E Spending (percent of total)	66%	46%	48%
Defense RDT&E Spending	\$ 6,960	\$ 37,352	\$ 42,300
Defense RDT&E Spending (percent of government spending)	80%	56%	56%
Private RDT&E Spending	\$ 4,500	\$78,300	\$ 79,300
Private RDT&E Spending (percent of total)	34%	54%	52%

Sources: Moteff, J.D., "Research and Development Funding: FY 1993," CRS Issue Brief, p. 1, August 13, 1992
Cowen, R., "President's Budget: Rosy Outlook for R&D," Science News, v. 139, p. 94, February 9, 1991.
Branscomb, L., "The case for a Dual-Use National Technology Policy," AQ, p. 41, Summer 1990.
Telephone conversation between M. Davey, Congressional Research Service, and the author, 22 September, 1992

2. DoD RDT&E and the U.S. Industrial Technology Base.

Defense RDT&E's relationship with the U.S. industrial technology base has changed significantly in the past 30 years. Defense RDT&E has typically been a leading force in U.S. research and development. However, this leading position has shifted and defense no longer dominates research and development in the civilian sector.

Civilian technology has surpassed its defense counterparts in some areas in the last several years. This is evident in different aspects throughout the Department of Defense. The "state-of-the-art" Tomahawk and Patriot missiles were both developed ten years ago. The micro processor in the Patriot missile is over 15 years old, outdated technology by current day civilian standards. [Ref. 19:p. 123] Commercial shipping uses navigation systems far superior to the antiquated systems used on our Navy vessels. These few examples are a far cry from "state-of-the-art" technology in the military. In fact, they indicate the military is behind the civilian sector in some technology areas.

Defense RDT&E has become so specialized and specific to defense-related systems that defense RDT&E has limited relevance to commercial industry. This is partly because of the divergence between defense and civilian RDT&E, a gap that began opening during the post World War II era. Following World War II, DoD was technologically on the leading edge. The Department wanted the separation from the private sector to keep critical technology away from our adversaries. This forced defense industries to separate their military and commercial businesses and the government to implement export controls. During times of a strong defense industrial base, the loss of overseas sales due to export controls was accepted as the price of national security. Now, as the superiority of defense technology erodes, the new challenge for DoD is to continue to limit the flow of critical technology to our adversaries while gaining timely access to U.S. and allied technology.

In the past, DoD technology was frequently adapted to commercial applications, as DoD was on the leading edge of research and development. The procurement process of setting military specifications and establishing quality control was used to force commercial industry to conform to defense standards. Today, the procurement process has in many cases been surpassed by the private sector. Hewlett Packard, for example, has concluded that defense business is not worth the intrusiveness of government regulations. [Ref. 20:p.

51] As a result, commercial industry has outpaced the defense industries in research and development. [Ref. 19:p. 118]

a. Dual-use Technologies.

One solution, advocated by some in Congress, is forcing the commercial and defense industrial bases closer to alignment through the use of dual-use technology. Dual-use technology refers to technology which has both military and civilian applications. For example, microchips used for precise missile guidance systems can also be used in children's toys and automobiles.

Although there is some debate over the applicability of the dual-use concept, interest in dual-use technology is a growing concern of congressional, Pentagon and industrial leaders, as a consequence of the declining availability of high-tech components and systems for the military. [Ref. 21:p. 121] Dual-use technology may enable DoD to continue to have access to state-of-the-art systems. The dual-use concept attempts to link civilian and defense RDT&E, providing both with more of a competitive edge in the world market.

But dual-use is not inherently the primary goal of any defense agency's RDT&E effort. Government agencies most certainly have an end use in mind for the research and development which they fund to further public missions. Likewise, the private sector funds its science and technology to further business goals. Thus dual-use technology is not the top priority of the government or the private sector. However, it may improve the efforts and results of both sectors.

Although it is sometimes very difficult to transfer defense technology to the civilian world, it can be very beneficial to both parties. As DoD's contribution to total spending for RDT&E shrinks, commercial technology policies must address the government's involvement in supporting the nation's technology base. The military must recognize its increasing dependence on technology from the private sector. [Ref. 22:p. 8]

Both parties must cooperate to maintain a strong industrial base in the future that can compete with the world economy.

Dual-use technology will allow DoD to bring its significant RDT&E funding to the commercial sector. Dual-use will allow DoD to be the initial buyer of the new technology with the potential for capital equipment investments and labor training. [Ref. 20:p. 57] Dual-use technology will also promote more flexible DoD policies towards procurement and research and development.

b. Dependence on Foreign Technology.

The other key aspect of change in the defense and civilian RDT&E relationship is U.S. dependence on foreign suppliers for defense technology. Foreign advances in technology have diluted the effectiveness of the U.S. technology base in many areas. Critical technologies are a key concern of both Congress and industry. For example, the U.S. once dominated semi-conductors and consumer electronics; however, these fields are now controlled by foreign organizations.

The emergence of a global economy will make dependence on foreign technology more difficult to reverse. Some of the most modern systems in the U.S. military rely on foreign supplies and technology for critical state-of-the-art components. [Ref. 23:p. 36-37] The F/A-18 and the Abrams tank both required key parts from Japan and Germany. [Ref. 20:p. 52] This creates a potential national security problem as well as industry concerns.

Keeping technology in the U.S. and reducing foreign dependency is a difficult task. DoD efforts to maintain critical technology within our borders can easily cross into tampering with the open market and commercial competitiveness. DoD has resisted the notion of an industrial base policy.

c. Strength of the Defense Industry.

The strength of the defense and civilian technology base has been eroded over the past two decades. [Ref. 19:p. 118] In an attempt to reverse this trend and bolster the critical technology base, federal budgets have been promoting more dual-use technologies that will benefit both civilian and defense applications. Through the budget, Congress has directed the Pentagon to fund corporate research efforts intended to enhance U.S. industrial competitiveness.

Both civilian and defense RDT&E budgets have been increasing the last several years. And their inter-relationship has been shifting in favor of the civilian sector. As noted earlier, the relationship between the defense and civilian budgets is moving closer to equilibrium from a peak split of 70-30 in favor of defense in 1986. This is mainly due to the defense reductions over the past several years.

The ultimate desire is to strengthen U.S. industrial competitiveness in both military and commercial research and development. One possible improvement to U.S. competitiveness is the reversal of the split between military and civilian RDT&E. Congress would like to minimize the divergence of the civilian and defense RDT&E efforts by promoting dual-use technologies and refocusing RDT&E efforts in both government and industry.

This chapter addressed the importance of the RDT&E budget. The next chapter will explain the elements of this budget and its size in relation to other major programs funded in the defense budget.

III. THE RDT&E BUDGET: COMPOSITION, SIZE, AND SHARE OF THE INVESTMENT BUDGET

"Despite the dramatic nature of the changes in our approach to acquisition and the increased emphasis on research and technology development, production will not evaporate," Donald Atwood, Deputy Defense Secretary, said, during testimony before the House Armed Services Research, Development and Procurement Subcommittee on 28 April, 1992. [Ref. 9:p. 12] The investment portion of the President's proposed defense budget for 1993 included \$60 billion for procurement and \$41.4 billion for RDT&E. [Ref. 9:p. 12] In terms of real growth over the previous year's funding, total RDT&E spending in the Bush budget will experience a 1.5 percent real increase in FY 1993, while the total DoD budget will experience a real decline of 7 percent. [Ref. 8:p. 34]

Not only is defense RDT&E changing in size and proportion within the defense budget, defense's portion of the total federal RDT&E budget is shifting as presidential and congressional interests change. In FY 1979, 48 percent of the total research and development budget was spent on defense. The shift toward defense RDT&E began during the Reagan Administration defense buildup. By 1986, 69 percent of the total research and development budget was for defense. Since then, the Bush Administration has reduced the defense share of federal RDT&E spending, equalizing the civilian and military RDT&E distribution in the FY 1993 budget. President Bush's proposed FY 1993 budget calls for total federal spending on research and development to be increased by 3 percent, to \$75.7 billion [Ref. 18:p 1]. Of this amount, roughly 56 percent would be allotted to defense RDT&E. [Ref. 9:p. 12]

A. COMPOSITION OF THE RDT&E BUDGET.

The RDT&E budget is developed and appropriated by accounts, budget activities and research activities. A fourth means of categorizing RDT&E dollars is in terms of new science and technology. Each of these approaches is explained below.

The RDT&E budget accounts include the three services, the Defense Agencies, the Director of Test and Evaluation, and the Director of Operational Test and Evaluation. The Defense Agencies budget includes funds for the Defense Advanced Research Projects Agency (DARPA) and the Strategic Defense Initiative Organization (SDIO). The President's Budget for FY 1993 requested funding for RDT&E budget accounts as indicated in TABLE II below.

TABLE II
FY 1993 RDT&E BUDGET REQUEST BY BUDGET ACCOUNT
(CURRENT DOLLARS IN MILLIONS)

Budget Account	FY 1993 Request
Army	\$ 5,415
Navy	\$ 8,518
Air Force	\$ 14,532
Defense Agencies	\$ 10,053
Dir. Test & Eval	\$ 282
Dir. Oper. Test & Eval	\$ 13
Total	\$38,813

Source: Department of Defense, Department of Defense Budget for Fiscal Year 1993: RDT&E Programs (R-1), January 29, 1992.

The budget activities for RDT&E are divided into six mission oriented categories. These budget activity categories include technology base, advance technology development, strategic programs, tactical programs, intelligence and communications, and defensewide mission support. Technology base includes funding for basic research and exploratory development, with the primary objective of increasing fundamental scientific knowledge adaptable to future problem solving needs and future requirements. Advanced technology development includes funding for exploration of options and concepts prior to development of specific weapons systems. The new technology developments are not attached to specific operational requirements. Strategic programs includes funding for strategic offensive, defensive and control systems. Tactical programs includes funding for advanced engineering and operational systems development related to tactical warfare. Intelligence and communications includes funding for advanced, engineering and operational systems development related in intelligence and worldwide communications. Defensewide mission support includes funding for the support of installations or operations required for use in general research and development and not allocable to specific missions. This area includes technical integration efforts, technical information activities, major test ranges, test facilities and instrumentation, target development, and other R&D support. [Ref. 24:p. C-8] The President's Budget for FY 1993 requested funding for RDT&E budget activities as indicated in TABLE III below.

TABLE III
FY 1993 RDT&E BUDGET REQUEST BY BUDGET ACTIVITY
(CURRENT DOLLARS IN MILLIONS)

Budget Activity	FY 1993 Request
Technology Base	\$ 4,084
Advanced Technology Development	\$ 7,683
Strategic Programs	\$ 4,647
Tactical Programs	\$ 13,241
Intelligence and Communications	\$ 5,011
Defensewide Mission Support	\$ 4,147
Total	\$38,813

Source: Department of Defense, Department of Defense Budget for Fiscal Year 1993: RDT&E Programs (R-1), January 29, 1992.

The research activities for RDT&E, another cross section of the RDT&E budget, are divided into six categories. These research activity categories include research, exploratory development, advanced development, engineering development, management support and operational systems development. Research includes scientific study and experimentation directed toward increasing knowledge in those fields related to long term nation security. This category provides fundamental knowledge in solving military problems. Exploratory development includes efforts toward a solution to a specific military problem, short of major development projects. Advanced development includes projects which are in the experimental or operational testing of hardware phase. Engineering development includes development programs being engineered for use but which have not been approved for procurement or operation. Management support includes research and development for

support of installations or operations required for general research and development use. These installations and operations are test ranges, laboratories, military construction and studies and analysis in support of the R&D program. Operational systems development includes research and development for development, engineering and testing of systems, support programs, vehicles and weapons which have been approved for production and employment. [Ref. 25:p. 14-16] The President's Budget for FY 1993 requested funding for RDT&E research activities as indicated in TABLE IV below.

TABLE IV
FY 1993 RDT&E BUDGET REQUEST BY RESEARCH ACTIVITY
(CURRENT DOLLARS IN MILLIONS)

Research Activity	FY 1993 Request
Research	\$ 1,124
Exploratory Development	\$ 2,986
Advanced Development	\$ 11,373
Engineering Development	\$ 8,994
Management and Support	\$ 2,899
Operational Systems Development	\$ 11,437
Total	\$38,813

Source: Department of Defense, Department of Defense Budget for Fiscal Year 1993: RDT&E Programs (R-1), January 29, 1992.

In his statement to the House Budget Committee in connection with the FY 1993 defense budget, Secretary Cheney made reference to new science and technology. New science and technology is a subset of the total RDT&E budget consisting of research not

geared to specific weapons. Funding for this category will climb to \$12.0 billion in FY 1993, up from \$10.6 billion in FY 1992. [Ref. 8:p. 34] Although there is not a separate or explicit breakout of this category, it is important because it reflects DoD's emphasis in leading edge research within the Department.

B. SIZE OF RDT&E BUDGET IN RELATION TO PROCUREMENT.

The relationship between the RDT&E budget and the procurement budget reflects three phases in defense budgeting since FY 1981. The first phase, FY 1981 to FY 1985, is the Reagan defense buildup. During this phase, real defense budget authority grew by more than eight percent each of the first three years, more than four percent for each of the subsequent two years and averaged 8.7 percent growth per year for the period.

The second phase reflects the defense budget reductions through the remainder of the 1980's. Real defense budget authority declined an average of 2.8 percent per year between FY 1986 and FY 1990.

The third phase, between FY 1991 and the present, reflects the end of the Cold War and the beginning of a regional defense strategy. During this phase, real defense budget authority declined an average of 6.4 percent, more than twice as rapidly as during phase two.

During first three years of phase one, procurement was growing at a faster rate than the RDT&E budget as the defense buildup was at its peak. Although the defense budget continued to grow during the last two years of the defense buildup, this trend was reversed. In FY 1984 and FY 1985, RDT&E grew faster than procurement. In FY 1981, RDT&E was 34 percent of the procurement budget. The RDT&E budget was outpaced by procurement spending through FY 1983 when it dropped to 28 percent, its lowest position relative to procurement in 12 years. However, during the last two years of this phase, the

RDT&E budget climbed to 32.4 percent of the procurement budget. During this five year period, procurement budget authority experienced average real growth of 17 percent per year, while RDT&E saw average real growth of 12.7 percent per year. RDT&E and procurement budget authority in current dollars, real growth and the RDT&E/Procurement ratios for phase one are displayed in TABLE V below.

TABLE V
RDT&E IN RELATION TO PROCUREMENT, PHASE ONE
(DOLLARS IN MILLIONS)

	PHASE I				
	1981	1982	1983	1984	1985
RDT&E (current \$)	\$16,609	\$20,060	\$22,798	\$26,867	\$31,327
Procurement (current \$)	\$48,025	\$64,462	\$80,355	\$86,161	\$96,842
RDT&E (real growth)	12.9%	14.3%	9.6%	13.6%	13.1%
Procurement (real growth)	26.1%	26.6%	19.5%	3.7%	9.0%
RDT&E/Procurement	34.6%	31.1%	28.4%	31.2%	32.4%

Source: Department of Defense, Office of the Comptroller of the DoD,
National Defense Budget Estimates for FY 1993, March 1992.

During the second phase, RDT&E declined at an average rate of 0.4 percent per year. However, RDT&E outpaced procurement growth by an average of 6 percent per year, as the procurement budget declined 6.2 percent per year. By FY 1990, the RDT&E budget had reached 44.8 percent of the procurement budget, slightly down from the peak of 47.3 percent in FY 1989. RDT&E and procurement budget authority in current dollars, real

growth and the RDT&E/Procurement ratios for phase two are indicated in TABLE VI below.

TABLE VI
RDT&E IN RELATION TO PROCUREMENT, PHASE TWO
(DOLLARS IN MILLIONS)

	PHASE II				
	1986	1987	1988	1989	1990
RDT&E (current \$)	\$33,609	\$35,644	\$36,521	\$37,530	\$36,459
Procurement (current \$)	\$92,506	\$80,234	\$80,053	\$79,390	\$81,376
RDT&E (real growth)	4.5%	2.8%	-1.2%	-1.4%	-6.5%
Procurement (real growth)	-7.5%	-16.3%	-3.9%	-4.4%	-1.0%
RDT&E/Procurement	36.3%	44.4%	45.6%	47.3%	44.8%

Source: Department of Defense, Office of the Comptroller of the DoD,
National Defense Budget Estimates for FY 1993, March 1992.

With the end of the Cold War and a shift in defense budget priorities, the third phase began. This is reflected by the rapid change in the relationship between RDT&E and procurement funding. During this phase, which encompasses FY 1991 through FY 1993, RDT&E budgets jumped from 50 percent to 71 percent of procurement budgets. Real growth in budget authority for RDT&E averaged -1.2 percent during this three year period, while the procurement budget real growth in budget authority averaged -15 percent. At -14.7 percent, procurement received the largest cut in real budget authority of any title in the defense budget in FY 1991, while the average growth for all other portions of the defense budget that year was -6.4 percent. In FY 1992, procurement continued to decline

in real terms by 18.3 percent while RDT&E declined by only 0.9 percent. The President's budget request for FY 1993 continued the trend of cutting procurement while increasing RDT&E. RDT&E and procurement budget authority in current dollars, real growth and the RDT&E/Procurement ratios for phase three are shown in TABLE VII below.

TABLE VII
RDT&E IN RELATION TO PROCUREMENT, PHASE THREE
(DOLLARS IN MILLIONS)

	Phase III		
	1991	1992	1993
RDT&E (current \$)	\$36,193	\$36,999	\$38,813
Procurement (current \$)	\$71,740	\$60,532	\$54,416
RDT&E (real growth)	-4.3%	-0.9%	1.5%
Procurement (real growth)	-14.7%	-18.3%	-13.0%
RDT&E/Procurement	50.5%	61.1%	71.3%

Source: Department of Defense, Office of the Comptroller of the DoD,
National Defense Budget Estimates for FY 1993, March 1992.

C. RDT&E IN RELATION TO THE OPERATIONAL PORTION OF THE BUDGET.

The relationship between the budgets for RDT&E and Operations and Maintenance (O&M) shows another set of shifts in priorities within the Pentagon throughout the past 13 years. The O&M portion of the budget represents current readiness and manpower, and is crucial to the short term strength of defense. The RDT&E budget represents future military strength and the economic impact of defense spending on the defense industrial base. The

relationship between the O&M and RDT&E budgets indicates, roughly, the tradeoffs between short term readiness and long term strength and economic growth in the defense industrial base.

The three phases noted in the comparison between RDT&E and procurement are not as pronounced in the relationship between O&M and RDT&E. However, the three phases are still evident. During phase one, real growth in budget authority for RDT&E was greater than real growth in budget authority for O&M every year. Additionally, RDT&E growth doubled O&M growth four out of the five years. The RDT&E budget was 30 percent of the O&M budget in FY 1981. This percentage gradually increased, reaching 40.3 percent by the end of this phase. RDT&E and O&M budget authority in current dollars, real growth and the RDT&E/O&M ratios for phase one are indicated in TABLE VIII below.

TABLE VIII
RDT&E IN RELATION TO O&M, PHASE ONE
(DOLLARS IN MILLIONS)

	PHASE I				
	1981	1982	1983	1984	1985
RDT&E (current \$)	\$16,609	\$20,060	\$22,798	\$26,867	\$31,327
O&M (current \$)	\$55,548	\$62,466	\$66,540	\$70,950	\$77,803
RDT&E (real growth)	12.9%	14.3%	9.6%	13.6%	13.1%
O&M (real growth)	9.2%	7.2%	4.5%	5.2%	7.4%
RDT&E/O&M	29.9%	32.1%	34.3%	37.9%	40.3%

Source: Department of Defense, Office of the Comptroller of the DoD,
National Defense Budget Estimates for FY 1993, March 1992.

During phase two, RDT&E and O&M maintained a relatively stable relationship. The RDT&E/O&M ratio declined slightly during this phase, slipping from 45 percent to 41 percent in FY 1990. This reflects the beginning of the defense drawdown, characterized by cutbacks in investment spending and on emphasis on readiness. Annual real growth in the O&M budget was relatively greater than growth in the RDT&E portion of the budget. RDT&E and O&M budget authority in current dollars, real growth and the RDT&E/O&M ratios for phase two are shown in TABLE IX below.

TABLE IX
RDT&E IN RELATION TO O&M, PHASE TWO
(DOLLARS IN MILLIONS)

	PHASE II				
	1986	1987	1988	1989	1990
RDT&E (current \$)	\$33,609	\$35,644	\$36,521	\$37,530	\$36,459
O&M (current \$)	\$74,888	\$79,607	\$81,629	\$86,221	\$88,309
RDT&E (real growth)	4.5%	2.8%	-1.2%	-1.4%	-6.5%
O&M (real growth)	-4.7%	2.8%	-0.7%	0.8%	-1.1%
RDT&E/O&M	44.9%	44.8%	44.7%	43.5%	41.3%

Source: Department of Defense, Office of the Comptroller of the DoD,
National Defense Budget Estimates for FY 1993, March 1992.

During phase three, Desert Shield/Desert Storm greatly affected levels of spending for O&M and consequently the ratio of RDT&E spending to O&M spending. In FY 1991, RDT&E had real growth of -4.3 percent while O&M had a real growth of 39.8 percent. This real growth in O&M reflects the surge of outlays in support of the war in the Persian

Gulf. In FY 1992, O&M returned to post-Cold War peacetime levels, reflected in TABLE X as a -30.8 percent real reduction from the previous year. The average growth in RDT&E for the three year period is -1.2 percent, while O&M declined -0.2 percent on average. By FY 1993, the effect of Desert Storm/Desert Shield has disappeared, and RDT&E spending as a percentage of spending for O&M was again at the 1986 peak level of 45 percent. RDT&E and O&M budget authority in current dollars, real growth and RDT&E/O&M ratios for phase three are reflected in TABLE X below.

TABLE X
RDT&E IN RELATION TO O&M, PHASE THREE
(DOLLARS IN MILLIONS)

	Phase III		
	1991	1992	1993
RDT&E (current \$)	\$36,193	\$36,999	\$38,813
O&M (current \$)	\$131,930	\$92,501	\$86,471
RDT&E (real growth)	-4.3%	-0.9%	1.5%
O&M (real growth)	39.8%	-30.8%	-9.7%
RDT&E/O&M	27.4%	40.0%	44.9%

Source: Department of Defense, Office of the Comptroller of the DoD,
National Defense Budget Estimates for FY 1993, March 1992.

D. RDT&E AND PROCUREMENT AS THE INVESTMENT PORTION OF THE BUDGET.

The investment portion of the defense budget is sometimes considered as the RDT&E, procurement and military construction (MILCON) budgets. However, this thesis will treat

only RDT&E and procurement as defense investment spending, as MILCON is not relevant to the scope of this thesis. The concern here is with the implications of investment budgets for both the defense industrial base and the military technology it produces and for the competitiveness of American industry. In this context, military construction is not relevant.

In general, investment spending grew in relation to the total budget during the defense buildup and declined when defense spending began to drop. The RDT&E budget increases after FY 1991 partially offset the procurement cuts during phase three, but they do not reverse the continuing decline in the ratio of investment spending to total defense spending. In general, the investment portion of the defense budget has maintained a relatively stable portion of the total budget since FY 1981. In FY 1981, the investment budget was 36.3 percent of the total, and by FY 1993 it had dropped slightly to 34.8 percent. The investment budget peaked as a percent of the total in FY 1986 at 44.8 percent.

During phase one, investment spending experienced an average real growth of 15.8 percent per year, as procurement and RDT&E were growing in the defense buildup years. The procurement budget alone averaged 17 percent growth during this phase, while RDT&E had an average real growth rate of 12.7 percent. As the procurement budget was growing faster than the RDT&E budget for the first three years of this phase, RDT&E's share of the investment budget was declining. In FY 1981, RDT&E was 25.7 percent of the investment budget. By FY 1985, RDT&E was 24.4 percent of the investment budget, up from the low of 22.1 percent in FY 1983. RDT&E and procurement budget authority in current dollars, real growth for RDT&E, procurement and investment, RDT&E/Investment, RDT&E/Total, procurement/total ratios and the investment/total ratios for phase one are shown in TABLE XI below.

TABLE XI
THE INVESTMENT BUDGET, PHASE ONE
(DOLLARS IN MILLIONS)

	PHASE I				
	1981	1982	1983	1984	1985
RDT&E (current \$)	\$16,609	\$20,060	\$22,798	\$26,867	\$31,327
Procurement (current \$)	\$48,025	\$64,462	\$80,355	\$86,161	\$96,842
RDT&E (real growth)	12.9%	14.3%	9.6%	13.6%	13.1%
Procurement (real growth)	26.1%	26.6%	19.5%	3.7%	9.0%
Investment (real growth)	22.4%	23.4%	17.1%	5.9%	10.0%
RDT&E/Investment	25.7%	23.7%	22.1%	23.7%	24.4%
RDT&E/Defense	9.3%	9.4%	9.5%	10.4%	10.9%
Procurement/Defense	26.9%	30.2%	33.6%	33.4%	33.8%
Investment/Defense	36.2%	39.5%	43.1%	43.8%	44.7%

Source: Department of Defense, Office of the Comptroller of the DoD,
National Defense Budget Estimates for FY 1993, March 1992.

During phase two, the investment budget began a steady decline as part of the defense drawdown. In FY 1986, the investment budget as a share of the defense budget peaked at 45 percent. From FY 1986, the investment budget experienced a steady decline in real growth, averaging -0.4 percent during this phase. Procurement declined an average of 6.6 percent. The cuts in the procurement budget had the greatest impact on the investment budget which averaged real growth of -5.0 percent for the phase. RDT&E, which had only moderate cuts or real growth except in FY 1990, was becoming a larger portion of the investment budget. RDT&E began this phase as 26.7 percent of the investment budget, and by FY 1989 was 32.1 percent of the investment budget. FY 1990 was the only year

during this phase where RDT&E real growth was less than procurement. During the defense drawdown, both the procurement and the investment share of the total declined steadily to FY 1990 levels of 27.8 and 40.2 percent, respectively. However, RDT&E's share of the total was increasing, except for FY 1990. RDT&E and procurement budget authority in current dollars, real growth for RDT&E, procurement and investment, RDT&E/Investment, RDT&E/Total, procurement/total and the investment/total ratios for phase two are indicated in TABLE XII below.

TABLE XII
THE INVESTMENT BUDGET, PHASE TWO
(DOLLARS IN MILLIONS)

	PHASE II				
	1986	1987	1988	1989	1990
RDT&E (current \$)	\$33,609	\$35,644	\$36,521	\$37,530	\$36,459
Procurement (current \$)	\$92,506	\$80,234	\$80,053	\$79,390	\$81,376
RDT&E (real growth)	4.5%	2.8%	-1.2%	-1.4%	-6.5%
Procurement (real growth)	-7.5%	-16.3%	-3.9%	-4.4%	-1.0%
Investment (real growth)	-4.5%	-11.2%	-3.1%	-3.4%	-2.7%
RDT&E/Investment	26.7%	30.8%	31.3%	32.1%	30.9%
RDT&E/Defense	11.9%	12.8%	12.9%	12.9%	12.4%
Procurement/Defense	32.9%	28.7%	28.2%	27.3%	27.8%
Investment/Defense	44.8%	41.5%	41.1%	40.2%	40.2%

Source: Department of Defense, Office of the Comptroller of the DoD,
National Defense Budget Estimates for FY 1993, March 1992.

During phase three, the investment share of the defense budget continues to decline. The increase in RDT&E spending during this period has not offset the decline of the procurement budget, as investment spending declined an average of 10.5 percent per year in FY 1991 through FY 1993. During this phase, procurement dropped 15.3 percent per year, while RDT&E declined by only 1.2 percent. RDT&E jumped from 33.5 percent of the investment budget to 41.6 percent. RDT&E's share of the total budget increased from 12.4 percent to 14.5 percent. Procurement, on the other hand, declined from 24.7 percent of the total to 20.3 percent, while the investment budget declined from 37.1 percent to 34.8 percent. RDT&E and procurement budget authority in current dollars, real growth for RDT&E, procurement and investment, RDT&E/Investment, RDT&E/Total, procurement/total and the investment/total ratios for phase three are shown in TABLE XIII below.

TABLE XIII
THE INVESTMENT BUDGET, PHASE THREE
(DOLLARS IN MILLIONS)

	Phase III		
	1991	1992	1993
RDT&E (current \$)	\$36,193	\$36,999	\$38,813
Procurement (current \$)	\$71,740	\$60,532	\$54,416
RDT&E (real growth)	-4.3%	-0.9%	1.5%
Procurement (real growth)	-14.7%	-18.3%	-13.0%
Investment (real growth)	-11.4%	-12.5%	-7.5%
RDT&E/Investment	33.5%	37.9%	41.6%
RDT&E/Defense	12.4%	13.4%	14.5%
Procurement/Defense	24.7%	21.9%	20.3%
Investment/Defense	37.1%	35.3%	34.8%

Source: Department of Defense, Office of the Comptroller of the DoD,
National Defense Budget Estimates for FY 1993, March 1992.

In FY 1991, the investment budget was 37.1 percent of the total defense budget, roughly the same as in FY 1981. Thus, the increases in investment spending in the early and mid-80's were nullified by the defense cuts in the late 1980's. Figure 1 displays the components of the investment budget from FY 1981 to FY 1993.

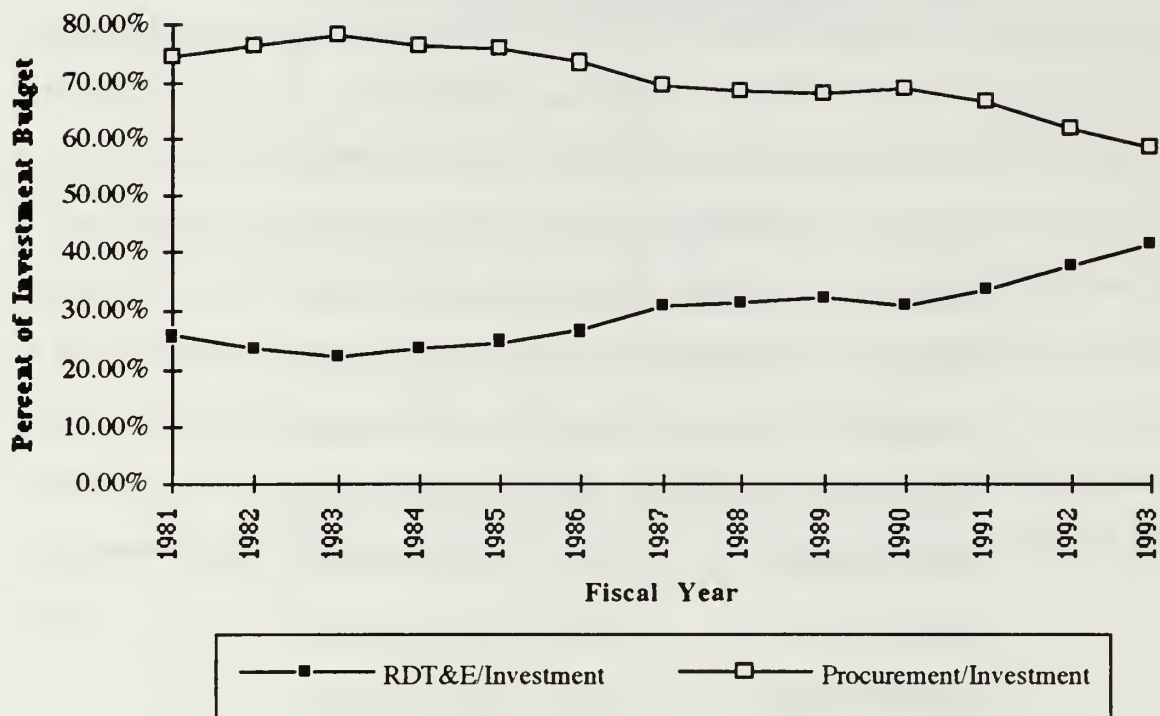


Figure 1
Components of the Investment Budget

Source: Department of Defense, Office of the Comptroller of DoD, National Defense Budget Estimates for FY 1993, March 1992.

E. THE RDT&E PORTION OF THE DOD BUDGET.

The three phases of the defense budget over the past 13 years are not apparent when only examining the RDT&E budget. In general, this budget title has grown in relation to the total every year except FY 1990 and FY 1991. In FY 1990, RDT&E lost one half of one percent in relation to the total and it remained at this level in FY 1991. It then resumed growing as a share of total defense spending.

In FY 1981, RDT&E was nine percent of the defense budget. Since FY 1981, the RDT&E budget has outpaced the growth of the Department of Defense's total budget every year except FY 1990. RDT&E received the largest increase of any of the Department's titles during FY 1984 and FY 1986. Between FY 1984 and FY 1987, the RDT&E budget increased as a share of total defense spending about one percent per year. By FY 1987, the RDT&E portion of the defense budget was 13 percent, a share it maintained through FY 1992. The Presidential Request for RDT&E in FY 1993 would raise its share to 14.5 percent. RDT&E budget authority in current dollars, real growth and the RDT&E/total ratios for FY 1981 to FY 1993 are shown in TABLE XI, TABLE XII, and TABLE XIII.

F. SUMMARY.

The RDT&E budget is developed and appropriated by budget accounts, budget activities and research activities. Budget accounts are the three services, the defense agencies, Director of Test and Evaluation and Director of Operational Test and Evaluation. Budget activities include technology base, advanced technology development, strategic programs, tactical programs, intelligence and communications and defensewide mission support. Research activities are research, exploratory development, advanced development, engineering development, management support and operational systems development.

Three distinct phases were found in analyzing the RDT&E budget.

1. Phase One, FY 1981-FY 1985.

This phase represents the defense build-up of the early 1980's. During this phase, real defense budget authority grew an average of 8.7 percent per year. The investment budget--procurement and RDT&E--was growing even faster, at an average of 15.8 percent per year. As a share of the total defense budget, investment grew from 36

percent to 45 percent. The main thrust of this growth was the procurement budget, reaching 78 percent of investment in FY 1983. During the final two years of this phase, RDT&E began growing faster than procurement, rebounding to 32 percent of the procurement budget.

RDT&E grew almost twice as fast as O&M during this phase. RDT&E as a share of the O&M budget increased from 30 percent in FY 1983 to 40 percent by FY 1985.

2. Phase Two, FY 1986-FY 1990.

Phase two represents the defense reductions of the late 1980's. Real defense budget authority declined by 2.8 percent per year during this phase. RDT&E was declining slower than procurement. During this phase, RDT&E averaged -0.4 percent growth as compared to -6.2 percent growth for procurement. RDT&E as a share of procurement increased from 36 percent to 45 percent.

RDT&E declined slightly as a share of the O&M budget, from 45 percent to 41 percent.

The investment budget declined from 45 percent to 40 percent as a share of the total defense budget, averaging -5.0 percent growth for the period. RDT&E, declining much slower than procurement, grew from 27 percent to 32 percent of the investment budget. While RDT&E funding was declining slightly, it continued to increase as a share of the total, climbing to 12.4 percent.

3. Phase Three, FY 1991-FY 1993.

This phase represents the end of the Cold War and the beginning of the regional defense strategy. This phase is significant because of its rapid decline in real defense budget authority, averaging 6.4 percent per year. RDT&E averaged a slight decline of -1.2 percent, noticeably slower than the -15 percent drop in procurement funding. During this phase, RDT&E as a share of procurement jumped from 50 percent to 71 percent.

RDT&E declined slightly faster than O&M, finishing at 45 percent of the O&M budget in FY 1993.

The investment budget continued an average decline of 10.5 percent per year. In FY 1993, the investment budget was 35 percent of the total defense budget as compared to 37 percent in FY 1991. RDT&E continued to gain as a share of both total defense spending and investment spending. By FY 1993, RDT&E was 14.5 percent of the total and 42 percent of the investment budget.

This chapter examined the size and composition of the RDT&E budget. The next chapter will address congressional oversight responsibilities and the RDT&E budget.

IV. CONGRESSIONAL OVERSIGHT OF THE RDT&E BUDGET

This chapter will examine the organizational arrangements and the perspective associated with congressional oversight of and interest in the defense RDT&E budget. The first section will address development of the authorization process as it concerns the RDT&E portion of the budget. Next, the congressional structure for oversight of the RDT&E budget will be addressed. The final section is a discussion of the views of key members of Congress as they impact the RDT&E budget. This section will address the opinions of Senator Jeff Bingaman and Congressman Les Aspin, both of whom play important roles in shaping congressional policy in this area.

A. THE BEGINNING OF CONGRESSIONAL AUTHORIZATION AND APPROPRIATION OF THE RDT&E BUDGET.

Prior to 1962, the RDT&E budget was not subject to the scrutiny Congress currently gives the defense budget. Before 1962, only two percent of the defense budget was subject to annual authorization by Congress. RDT&E funds were not among those. The RDT&E budget was subject to annual review and approval only as part of the appropriation process. Congress's role was to provide general guidance to the Department of Defense, and to avoid interfering with decisions being made at the top levels of the Department. For example, the general guidance in the typical authorization bill prior to 1962 directed the Secretaries of the Air Force and Navy "to procure and construct guided missiles" or the Secretary of the Air Force to "procure 24,000 serviceable aircraft...as he may determine." [Ref. 26:p. 29-30] This was the only direction provided to the services for procurement of these major aircraft and missile systems. Congressional oversight was very limited,

permitting top DoD officials to determine specifications and mixture of the aircraft and missiles.

In 1962, Congress began reviewing the procurement budget as part of the annual defense authorization bill. During this first year, seventy-five percent of the procurement budget was authorized separately by congressional committees. By 1983, one hundred percent of the procurement budget was subject to annual authorization. In 1965, Congress began to separately authorize the RDT&E segment of the budget, and since then, the entire RDT&E budget has been subject to annual authorization.

B. CONGRESSIONAL OVERSIGHT STRUCTURE.

Because the defense RDT&E budget is both authorized and appropriated every year as part of the process of passing defense legislation, oversight occurs within the committees responsible for this legislation. The authorizing committees are the House and Senate Armed Service Committees. These committees define the scope of defense spending and set upper limits on the amounts that Congress can appropriate for each specific program.

In the House of Representatives, the Subcommittee on Research and Development of the Armed Services Committee has jurisdiction over RDT&E spending. In the Senate, this responsibility is assigned to the Subcommittee on Defense Industry and Technology of the Armed Services Committee.

Authorization alone does not make funds available--that is a function of appropriations. Appropriations bills provide the actual authority to incur obligations and to make payments out of the Treasury for specific purposes as delineated by Congress. These bills are within the jurisdiction of the Subcommittees on Defense in both the House and Senate. These Subcommittees are part of the Appropriations Committees in their respective chambers.

C. CONGRESSIONAL OVERSIGHT METHOD.

The RDT&E budget is formally presented to Congress in a document referred to as the R-1. The R-1 is similar to the P-1, the line item publication for procurement. The R-1 represents DoD's plan for spending research and development dollars reflected in several formats referred to in chapter III of this thesis.

The R-1 is divided into three different accounts or activities. These three accounts or activities represent cross sections of the RDT&E budget. The R-1 lists the totals for RDT&E budget accounts, budget activities and research activities.

As described in chapter III, the budget accounts include the three services, the defense agencies, the Director of Test & Evaluation Defense and the Director of Operational Test and Evaluation.

These accounts are further broken into six activities. These activities are: technology base, advance technology development, strategic programs, tactical programs, intelligence and communications, and defense-wide mission support. Within these activities, the R-1 is then further broken down into specific line items. For example, a line item in the Navy's appropriation for RDT&E in tactical programs is "ATA/AX." [Ref. 27:p. 121] In this case, the Navy is the budget account, tactical programs is the budget activity and "ATA/AX" is the line item.

RDT&E research activities identified in the R-1 include research, exploratory development, advanced development, engineering development, management and support and operational systems development.

D. CONGRESSIONAL OVERSIGHT INTEREST AND ISSUES.

Congress and the Pentagon agree that a strong industrial base and a technological advantage over potential enemies are critical to future success on the battlefield. For these reasons, Congress has a keen interest in defense RDT&E policy. Key members of the Armed Services Committee often direct the Pentagon to take specific actions regarding the defense industrial base. The Pentagon, on the other hand, has resisted congressional initiatives that it considers industrial policy. The Pentagon prefers that market forces, free trade and competitiveness play the primary role in shaping the defense industrial base.

The remainder of this section will examine the perspective of two members of Congress currently active in defense RDT&E issues. The first is Congressman Les Aspin, Chairman of the House Armed Services Committee. The second is Senator Jeff Bingaman, Chairman of the Subcommittee on Defense Industry and Technology of the Senate Armed Services Committee.

1. RDT&E and the House Armed Service Committee.

Les Aspin, Chairman of the House Armed Services Committee, believes the importance of the technological base is to minimize casualties and ensure quick and decisive action to protect our national interests. Congressman Aspin has recently proposed legislation which provides for selective upgrading, low-rate procurement, continuous prototyping and development to meet technology requirements in future development cycles.

Aspin has also proposed what he calls "silver bullet" procurement. [Ref. 28:p. 3] "Silver bullet" procurement refers to the purchase of highly capable systems in limited quantities. This type of procurement would be reserved for situations where high-tech advantage could maximize U.S. leverage on the battlefield.

The thrust of Congressman Aspin's program is to maintain critical areas of the defense industrial base and maintain our current technological edge. On the cost savings

side, Congressman Aspin contends that generation after generation of new systems do not have to be purchased. Technology can be maintained and transferred into the future for use when the situation calls for the technology.

In the National Defense Authorization Act for Fiscal Year 1993, Chairman Aspin addresses several policy issues key to the Department of Defense and to the defense RDT&E budget. The policy issues raised by Congressman Aspin are maintaining the defense industrial base, dual-use technology, technology transfer, manufacturing technology, critical technology and critical skills in technology. [Ref. 27:p.99-105] All of these issues were incorporated into the House's Defense Authorization Act for Fiscal Year 1993.

Regarding maintenance of the defense industrial base, Congressman Aspin supports a moderate and sustained two percent increase in the RDT&E budget for five years. This sustained growth is to aid the stagnating industrial base. He opposed exceeding this two percent limit, as evidenced by his committee's reduction of funds requested by the Administration above two percent in FY 1993 technology base improvements. [Ref. 27:p. 103-104]

In dual use technology, Aspin's committee recognized that funding for non-defense technology could be used to improve defense systems. The Committee also addressed the similarities in the critical technology lists published by the Office of Science and Technology Policy and the Department of Defense. These similarities document military and civilian technology which could enhance the technology efforts of both the defense and non-defense sectors of the economy.

Technology transfer was stressed by Congressman Aspin at two separate levels. First, technology transfer was emphasized between non-defense and defense organizations. Federally funded research and development centers should transfer and share technology with the public and private sectors to enhance product advancement. This can be

accomplished through several cooperative research organizations and agreements. More opportunities to access technology for non-defense research will enhance research efforts for technology transfer throughout the research and development infrastructure.

Secondly, technology sharing was also stressed between the services and within the Department. This was emphasized specifically in areas of nuclear, chemical and biological protective equipment. The Committee wants a complete joint effort in development for this project.

Congressman Aspin and his Committee favor increased efforts in manufacturing technology (MANTECH). Manufacturing technology is improving manufacturing processes and technology to lower costs and increase performance. The Armed Services Committee increased funding to a level higher than the Administration's request, stressing the importance of developing manufacturing methodologies within each of the services.

In the area of critical technology and critical skills in technology, Congressman Aspin wants a complete analysis to provide the baseline for a future investment strategy to eliminate vulnerabilities in defense planning. This analysis would identify critical technologies and skills within the defense industrial base to address actions required by the Department to address shortfalls and preserve the defense industrial base.

2. RDT&E and the Senate Subcommittee on Defense Industry and Technology of the Armed Services Committee.

On the Senate side, Senator Jeff Bingaman, Chairman of the Subcommittee on Defense Industry and Technology of the Senate Armed Services Committee, may be the most active member in terms of defense RDT&E policy making. Senator Bingaman has proposed a significant amount of legislation in the areas of critical and dual-use technology over the past four years. Senator Bingaman wrote the legislation requiring DoD to publish the annual Critical Technologies Plan. Additionally, he is a proponent of the Defense Advanced Research Projects Agency (DARPA) and the Critical Technologies Institute

(CTI), a federally funded RDT&E center under the Office of Science and Technology Policy. Senator Bingaman's view is that the federal government should support technology, especially in critical technology areas. [Ref. 29:p. 26-27]

Senator Bingaman's overall objective for defense is to provide maximum technological support of the long range strength of U.S. defense. This will ensure strong capabilities for U.S. security whatever the nature of the threat in the future. The trade-off is sacrificing the short term readiness of today's armed forces and transferring these funds into the future for tomorrow's military power. [Ref. 30:p. 57]

Senator Bingaman advocates robust investment in critical long-term technologies. This investment, according to Senator Bingaman, is as important as military deterrence for national security. In today's global economy, national security is dependent on technology, industrial strength and economic vitality. Technology, rather than raw military power, is becoming the measure of industrial power. This emphasis in technology is crucial to national security and U.S. competitiveness in the world marketplace. Therefore, Senator Bingaman endorses a strong national technology vision to take the U.S. into the 21st century.

Senator Bingaman is a very strong advocate of dual-use technology. The Senator considers the nation's weakness in dual use technology to be a growing concern. He believes that strengthening dual use technologies will reduce our dependence on foreign technology. In today's global economy and world-spanning companies, it is a national interest to maintain critical technologies within the nation's borders whether dealing with friends or foes.

As civilian research and development has outpaced military research and development, the increased utilization of dual use technology will aid both research efforts. Driving technology in the two sectors closer together will improve future technology and competitiveness.

The Senate's version of the FY 1992 defense authorization bill contains a new technology initiative that requires the Pentagon to devote a larger portion of its RDT&E funds to dual-use technology. His initiative requires the President's science advisor to draft "road maps" for the development of the 22 critical technologies listed in the 1991 critical technology report. This initiative is in line with setting a "rational technology policy for the country," says Senator Bingaman. [Ref. 31:p. 2090]

E. SUMMARY.

Since FY 1965, the RDT&E budget has been subject to annual review as part of both the authorization and appropriation process. The RDT&E budget must be authorized and appropriated by the respective committees in the House and the Senate responsible for defense RDT&E oversight. This committees receive the R-1 which is the formal presentation of the RDT&E budget.

Clearly, some congressional leaders desire to set a defense industrial base policy for the country, to support these policies with specific funding proposals, and to improve U.S. industry competitiveness overseas. Congressman Aspin and Senator Bingaman consider modifications to the free market as the necessary means to the realization of these policy objectives.

The Bush Administration is for a strong industrial base and improved competitiveness overseas; however, the Administration prefers that the free market determine the size and make-up of the reduced industrial base in the future. As we will see in the next chapter, Congress has not been reluctant to intervene in the market place to preserve the industrial base, much to the Administration's chagrin. The very detailed analysis of the RDT&E budget that follows in the next two chapters will support this argument.

V. THE SCOPE OF CONGRESSIONAL INTERVENTION IN THE RDT&E BUDGET

This chapter examines the top line or total changes to the President's request for RDT&E funding made by Congress between FY 1983 and FY 1992. The purpose of this analysis is to determine whether RDT&E funding requests were adjusted to the same degree that the defense budget as a whole was changed. The chapter begins with a discussion of the methodological issues encountered in developing these comparisons. The methodology applies to this chapter as well as chapter VI.

A. METHODOLOGY.

The data for the next three chapters is provided by the Comptroller of the Department of Defense. The data includes two books for each fiscal year, one for the authorization and one for appropriation. The authorizations books include all milestones up to and including the final congressional authorization. The milestones prior to the final conference agreement on authorization include the President's request and each chamber's authorization. The appropriation books are organized on the same format plus the final authorization levels.

For FY 1991 and FY 1992, final authorization figures are not included in the appropriation books. Any conflicts in figures between the authorization and appropriation books were resolved by using the appropriation figures as this was the latest information available and deemed most accurate. Any adjustments and discrepancies are noted in a separate section below. Total obligational authority is used for all data in the next three chapters. Total obligation authority is described in the next section.

1. Total Obligational Authority.

Total Obligational Authority (TOA) is the value of the direct defense program for a fiscal year. It is the sum of all budget authority granted by Congress, amounts authorized to be credited to a specific fund and unobligated balances from previous years which remain available for obligation. Defense TOA is different from budget authority (BA) for several reasons. First, some BA lapses before it is obligated. This would decrease TOA with no effect on BA. Second, some shelf stock sales receipts are used to finance direct programs. This would increase TOA with no effect on BA. Third, some legislation changes the purpose of specific funds and transfers the unobligated balances. This would decrease BA with no effect on TOA. Fourth, public cash collections from net offsetting receipts that arise out of business or market-oriented activities by the government are received. These funds are deposited in receipt accounts. This would decrease BA but have no effect on TOA. [Ref. 1:p. 1-2]

During the ten year evaluation period, the difference between TOA and BA was minimal. In FY 1992, the defense appropriation TOA was \$278.8 billion, as compared to \$278.1 billion in BA. This is a difference of \$745 million or 0.2 percent of the defense appropriation. The two largest differences between TOA and BA were 1.6 and 0.8 percent in the FY 1986 and FY 1988 authorization bills, respectively. The average difference is less than a trivial 0.3 percent.

The procurement and RDT&E budgets were affected even less by the difference between TOA and BA. Procurement TOA and BA were different in one request, three authorization bills and two appropriation bills. Since FY 1989, there has not been any difference between TOA and BA, as the last of these differences was in FY 1988. The only differences between RDT&E TOA and BA were three authorization bills. Again, the last of these differences was in FY 1988. For RDT&E, the request and appropriation reflected no differences between TOA and BA.

2. Adjustments.

This section will address adjustments which were necessary to make the required comparison between presidential requests for RDT&E funding and congressional actions. These adjustments occurred in three areas: Defense, Procurement, and RDT&E.

a. Defense Total Obligational Authority.

An adjustment to defense was necessary because military pay, non-action¹, some military construction, and other legislation are included in appropriations bills, but not in authorization bills. If this adjustment was not made, erroneous results could be determined in assuming that the authorizers were too stringent in the budget process and the appropriators were too generous.

The comptroller data books contain two separate Presidential defense requests, one for the authorization committees and one for the appropriation committees. For purposes of comparing the request to the authorization and appropriation bills, the appropriation request was used.

The original authorization request was increased by the difference between the authorization request and the appropriation request. For example, in FY 1990 the authorization request was \$214,246 million dollars. The appropriation request was \$296,616 million dollars. The difference of \$82,370 million dollars (\$296,616 - \$214,246) was added to the authorization. This was done for comparability from request to authorization to appropriation.

b. Procurement Total Obligational Authority.

An adjustment to procurement was necessary because funds for the Defense Production Act (DPA) were included in the appropriation request and bill but not in the

¹ Non-Action includes defensewide contingencies, deductions for offsetting receipts, trust funds, interfund transactions, and the defense homeowner assistance fund.

authorization request and bill. If this adjustment was not made, the authorization and appropriation numbers would not be comparable. The Defense Production Act was authorized separately. The Defense Production Act was applicable from FY 1985 to FY 1992.

For purposes of comparison, the procurement figures for appropriation were used. This eliminated the discrepancy of the Defense Production Act. The authorization was increased by the funding for the Defense Production Act. For example, the Defense Production Act was appropriated \$50 million dollars in FY 1990. This amount was added to the authorization numbers for comparability.

c. RDT&E Total Obligational Authority.

An adjustment to RDT&E funding was necessary because funds for the Special Foreign Currency Program (SFC) were included in the authorization but not in the appropriation. If the special foreign currency program funds were not subtracted from the authorization request and bill, the authorization and appropriation numbers would not be comparable. The Special Foreign Currency Program was applicable from FY 1983 to FY 1985.

The RDT&E request was taken from the appropriation books. This eliminated the discrepancy of the Special Foreign Currency Program. The authorization was decreased by the funding for the Special Foreign Currency Program. For example, the Special Foreign Currency Program was authorized \$8.65 million dollars in FY 1985. This amount was subtracted from the authorization numbers for comparability. According the comptroller data books, the Special Foreign Currency Program was appropriated separately.

d. Amended Requests.

One additional area is noteworthy in this section. In FY 1983, FY 1984 and FY 1988, the President amended the budget request. The amendment was not included in

the authorization data in FY 1983. For purposes of analysis and comparability, the request reflected in appropriation data was used, in order to capture the effect of these budget amendments. Authorization figures matched between the authorization and appropriation data each of the three years, after the correction for SFC or DPA was applied.

3. Discrepancies.

This section will address certain discrepancies noted in the authorization and appropriation data. Only specific years which contain unresolved discrepancies will be addressed.

In FY 1983, the procurement request has an unexplained difference of \$69.7 million dollars between the authorization and appropriation books. In this case, the appropriation numbers were used.

In FY 1990, the procurement and RDT&E requests have unexplained differences of \$3.0 billion and \$284.4 million dollars, respectively. The appropriation data was used to resolve this discrepancy.

In FY 1991, the procurement and RDT&E requests have unexplained differences of \$699.4 million and \$85.3 million dollars, respectively. The appropriation data was used to resolve this discrepancy.

In FY 1992, the procurement and RDT&E requests have unexplained differences of \$851.6 million and \$851.6 million dollars, respectively. The appropriation data was used to resolve this discrepancy.

B. DEFENSE AND INVESTMENT BUDGETS: FROM REQUEST TO FINAL APPROPRIATION.

The budget process during the last ten years reveals two very distinct patterns in the congressional oversight of the defense budget. During FY 1983 to FY 1988, the request was typically reduced by the authorizing committees, then further reduced by the

appropriation committees. During the period of FY 1989 to FY 1992, congressional budget changes indicate a different pattern in the budget process. This pattern reflects very small congressional changes, increases or decreases, to the budget. These patterns are consistent in the defense, procurement and RDT&E budgets.

1. The Defense Budget.

The defense budget was changed between the request and the final appropriation by an average of -4.81 percent each year during FY 1983 to FY 1992. However, congressional changes averaged -6.86 percent during the FY 1983 to FY 1988 period, much higher than the ten year average. During the FY 1989 to FY 1992 period, the -1.72 percent changes from request to appropriation were very small as compared to the ten year average. The reductions taken during the 1983-1988 period were nearly four times as great as those taken in the following four years.

In general, the changes during the authorization cycle were greater than the changes made from authorization to appropriation. This is explained by the fact that according to congressional rules, the authorizing bills are to set upper limits on program funding. The role of the appropriation committees is to determine specific funding levels within these limits. However, the House and Senate Appropriations Committees can waive, ignore, change or repeal the rules against unauthorized appropriations. [Ref. 32:p. 7]

The average change from request to authorization was -3.17 percent from FY 1983 to FY 1992, whereas the authorization to appropriation changes were -1.70 percent for the same period. This is reflected in TABLE XIV.

During the first six years, FY 1983 to FY 1988, the request was reduced -4.40 percent during the authorization cycle, as compared to -1.33 percent for FY 1989 to FY 1992. The authorization to appropriation changes were -2.57 percent from FY 1983 to FY 1988 as compared to -0.40 percent for the second four years. These changes confirm the

expectations that changes to the President's budgets were greater in the request to authorization cycle than the authorization to appropriation cycle.

Several years are noteworthy in examining the defense budget from request to authorization to appropriation. The first six years, through FY 1988, reveal a standard pattern, according to which the major cut is performed during the authorization cycle, while a much smaller reduction to that level is made during the appropriation cycle.

This sequence does not hold during the remaining four years of the period. In FY 1989, both the authorization and appropriation were higher than the President's request for defense. The appropriation in FY 1989 was still slightly lower than the authorization. In FY 1990, the authorization was higher than the request, then the appropriation reduced the authorization to an amount lower than the original request. In FY 1991, the standard pattern of the authorization reducing the request and the appropriation further reducing the authorization is evident but in different proportions. The authorization greatly reduced the request, most likely due to the Budget Enforcement Act of 1990. The appropriation, then, reduced the authorization by only -0.4 percent. The changes to the defense budget are indicated in TABLE XIV and graphed in Figure 2.

TABLE XIV
DEFENSE AUTHORIZATION AND APPROPRIATION CHANGES

Fiscal Year	Request to Appropriation	Request to Authorization	Authorization to Appropriation
1983	-7.3%	-2.7%	-4.7%
1984	-4.5%	-4.3%	-0.2%
1985	-6.5%	-4.1%	-2.4%
1986	-7.9%	-4.0%	-4.1%
1987	-9.7%	-8.1%	-1.7%
1988	-5.4%	-3.1%	-2.4%
1989	+0.2%	+0.5%	-0.3%
1990	-0.6%	-0.3%	-0.8%
1991	-6.5%	-5.8%	-0.7%
1992	-0.1%	-0.2%	+0.1%
1983-1992	-4.81%	-3.17%	-1.70%
1983-1988	-6.86%	-4.40%	-2.57%
1989-1992	-1.72%	-1.33%	-0.40%

Source: Department of Defense, Office of the Comptroller of DoD, Congressional Action on FY 19XX Authorization Request, 1983-1992.
Department of Defense, Office of the Comptroller of DoD, Congressional Action on FY 19XX Appropriation Request, 1983-1992.

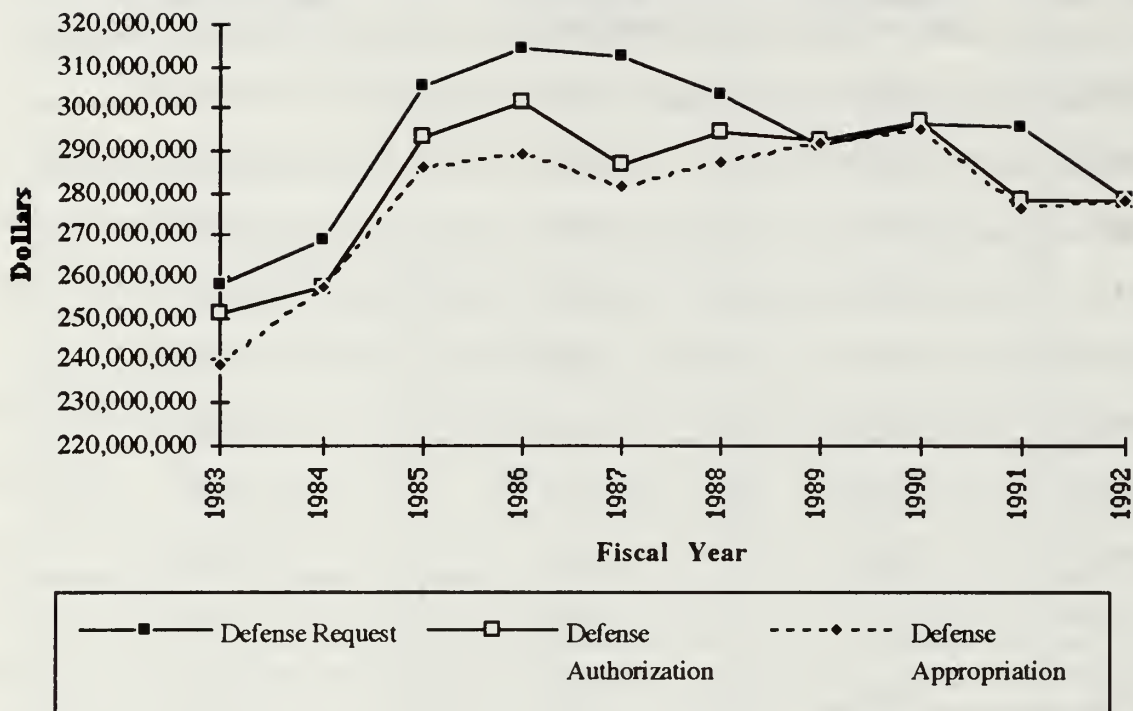


Figure 2
Defense Request, Authorization and Appropriation
 (Current Dollars in Thousands)

Source: Department of Defense, Office of the Comptroller of DoD, Congressional Action on FY 19XX Authorization Request, 1983-1992.

Department of Defense, Office of the Comptroller of DoD, Congressional Action on FY 19XX Appropriation Request, 1983-1992.

2. The Procurement Budget.

The procurement budget was changed, request to appropriation, an average of -5.05 percent each year from FY 1983 to FY 1992. Overall congressional changes were -7.64 percent during the FY 1983-FY 1988 period, much higher than the ten year average. During the FY 1989 to FY 1992 period, the -1.15 percent changes from request to appropriation were much smaller than the overall average.

As in the defense budget, the changes made from request to authorization were greater than the changes made from authorization to appropriation. The average change from request to authorization was -4.09 percent from FY 1983 to FY 1992, whereas the authorization to appropriation changes were -1.03 percent for the same period. During the first six years, the request to authorization changes were -5.52 percent, as compared to -1.94 percent for FY 1989 to FY 1992. The authorization to appropriation changes were -2.23 percent from FY 1983 to FY 1988 as compared to +0.78 percent for the second four years.

Several years are important in examining the procurement budget from request to authorization and from authorization to appropriation. The first five years, through FY 1987, reveal the standard pattern of the authorization reducing the request and the appropriation reducing the authorization. In FY 1987, the final appropriation bills differed by only -0.1 percent from the final authorization bill.

For procurement, FY 1988 is the beginning of change in the pattern of congressional oversight. In FY 1988, the appropriation was increased to a higher funding level than the authorization and the request. In FY 1989, both the authorization and appropriation were higher than the President's procurement request. In FY 1990, the authorization bill added to the request, then the appropriation further increased procurement funding. In FY 1991, the authorization greatly reduced the request, most likely due to the Budget Enforcement Act of 1990. The appropriation committee made only a small adjustment for procurement over the authorization. The changes to the procurement budget are indicated in TABLE XV and graphed in Figure 3.

TABLE XV
PROCUREMENT AUTHORIZATION AND APPROPRIATION
CHANGES

Fiscal Year	Request to Appropriation	Request to Authorization	Authorization to Appropriation
1983	-9.9%	-3.6%	-6.6%
1984	-6.6%	-4.7%	-2.0%
1985	-9.7%	-6.2%	-3.8%
1986	-8.8%	-4.7%	-4.3%
1987	-11.3%	-11.2%	-0.1%
1988	+0.5%	-2.9%	+3.5%
1989	+0.5%	+1.6%	-1.2%
1990	+6.8%	+4.0%	+2.7%
1991	-13.1%	-13.5%	+0.4%
1992	+1.2%	+0.1%	+1.2%
1983-1992	-5.05%	-4.09%	-1.03%
1983-1988	-7.64%	-5.52%	-2.23%
1989-1992	-1.15%	-1.94%	+0.78%

Source: Department of Defense, Office of the Comptroller of DoD, Congressional Action
on FY 19XX Authorization Request, 1983-1992.
Department of Defense, Office of the Comptroller of DoD, Congressional Action
on FY 19XX Appropriation Request, 1983-1992.

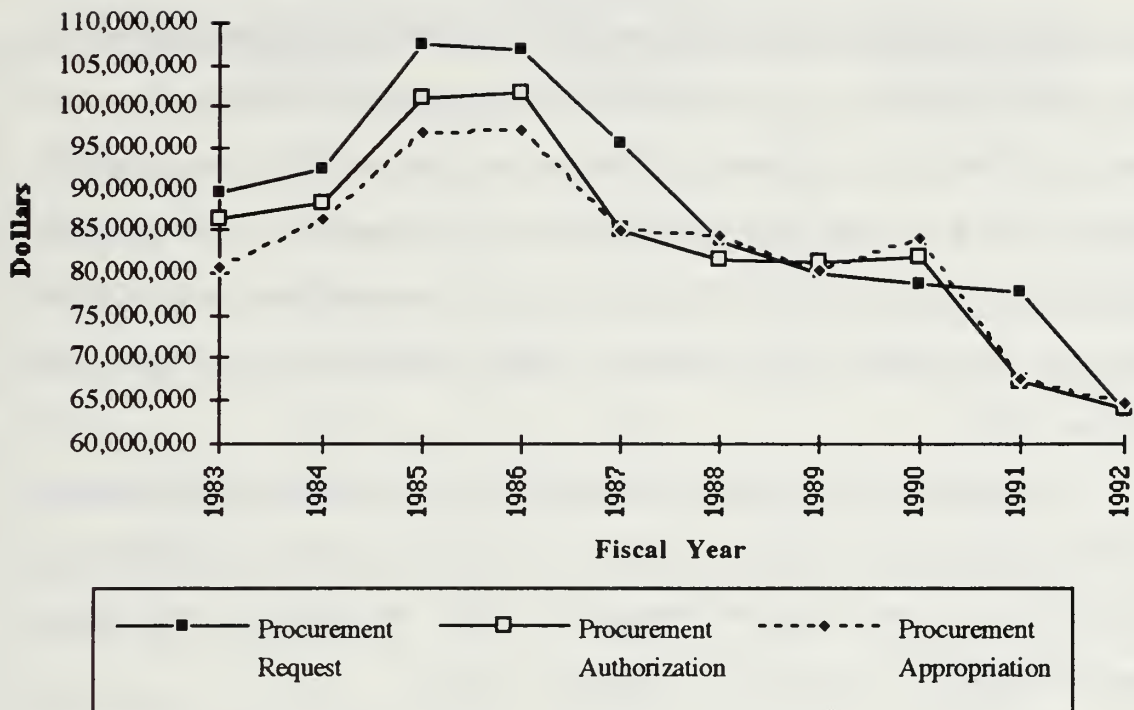


Figure 3
Procurement Request, Authorization and Appropriation
 (Current Dollars in Thousands)

Source: Department of Defense, Office of the Comptroller of DoD, Congressional Action on FY 19XX Authorization Request, 1983-1992.
 Department of Defense, Office of the Comptroller of DoD, Congressional Action on FY 19XX Appropriation Request, 1983-1992.

3. The RDT&E Budget.

The RDT&E budget was changed, request to appropriation, an average of -7.37 percent each year from FY 1983 to FY 1992. However, overall congressional changes were -10.19 percent during FY 1983-FY 1988 period, much higher than the ten year average. During the FY 1989 to FY 1992 period, the -3.14 percent changes from request to appropriation were approximately one third as large as the overall average.

As with the defense and procurement budgets, the changes made from request to authorization were greater than the changes made from authorization to appropriation. The average change from request to authorization was -5.20 percent from FY 1983 to FY 1992, whereas the authorization to appropriation changes were -2.30 percent for the same period. During FY 1983 to FY 1988, the request to authorization changes were -7.39 percent as compared to -1.91 percent for FY 1989 to FY 1992. The authorization to appropriation changes were -3.01 percent from FY 1983 to FY 1988 as compared to -1.24 percent for the second four years.

The standard pattern according to which the request was significantly reduced by the authorization process and then cut again by a much smaller amount in the appropriations cycle holds for all years except FY 1988 and FY 1989. The pattern is more evident between FY 1983 and FY 1988 than it is in the last four years.

In FY 1992, the authorization increased funding for RDT&E by 2.1 percent, but the appropriation bill trimmed that increase to 0.5 percent over the President's request. The changes to the RDT&E budget are indicated in TABLE XVI and graphed in Figure 4.

TABLE XVI
RDT&E AUTHORIZATION AND APPROPRIATION CHANGES

Fiscal Year	Request to Appropriation	Request to Authorization	Authorization to Appropriation
1983	-6.9%	-5.6%	-1.5%
1984	-6.2%	-4.2%	-2.1%
1985	-8.2%	-5.6%	-2.8%
1986	-10.0%	-8.2%	-2.0%
1987	-14.6%	-13.6%	-1.1%
1988	-15.1%	-7.2%	-8.5%
1989	-1.3%	-0.5%	-0.8%
1990	-6.2%	-4.0%	-2.2%
1991	-5.6%	-5.2%	-0.3%
1992	+0.5%	+2.1%	-1.6%
1983-1992	-7.37%	-5.20%	-2.30%
1983-1988	-10.19%	-7.39%	-3.01%
1989-1992	-3.14%	-1.91%	-1.24%

Source: Department of Defense, Office of the Comptroller of DoD, Congressional Action on FY 19XX Authorization Request, 1983-1992.
Department of Defense, Office of the Comptroller of DoD, Congressional Action on FY 19XX Appropriation Request, 1983-1992.

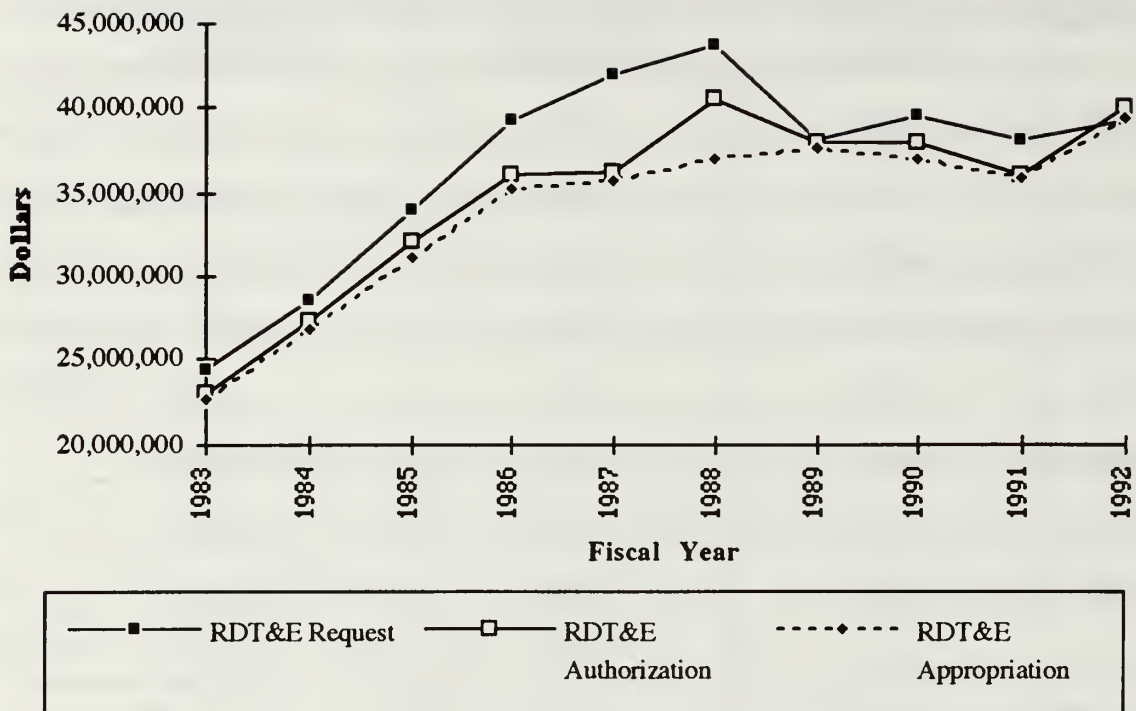


Figure 4
RDT&E Request, Authorization and Appropriation
 (Current Dollars in Thousands)

Source: Department of Defense, Office of the Comptroller of DoD, Congressional Action on FY 19XX Authorization Request, 1983-1992.

Department of Defense, Office of the Comptroller of DoD, Congressional Action on FY 19XX Appropriation Request, 1983-1992.

C. THE COMPARISON OF CHANGES TO THE BUDGET.

The top line changes made by Congress to the President's request for total defense spending, procurement and RDT&E reveal a slight difference in the quantity of changes. The average cut in the total defense budget for the ten year evaluation period was 4.81 percent per year. During this period, the procurement and RDT&E budgets received greater reductions, averaging 5.05 percent and 7.37 percent per year, respectively.

Overall, the procurement budget was reduced slightly more than the defense budget, while RDT&E funding was reduced by almost twice the amount that the defense budget was cut.

During FY 1983 to FY 1988, the differences in the size of these adjustments are even more dramatic. The defense budget was trimmed an average of 3.15 percent during this period. But the procurement and RDT&E budgets were cut 7.64 and 10.19 percent per year, respectively. The procurement budget reduction is over twice the overall defense cut, while the RDT&E budget reduction is over three times the average for the defense budget.

During the FY 1989 to FY 1992 period, the defense budget was trimmed an average of 1.72 percent per year. The procurement budget averaged a 1.15 percent reduction per year, while the RDT&E budget averaged 3.14 percent reduction per year. During this period, the average procurement reduction was less than the total defense budget, while the RDT&E reductions averaged almost twice the reductions in the defense budget. TABLE XVII displays the average reductions, request to appropriation, for defense, procurement and RDT&E.

TABLE XVII
DEFENSE, PROCUREMENT AND RDT&E BUDGET CHANGES

Fiscal Years	Defense	Procurement	RDT&E
1983-1992	-4.81%	-5.05%	-7.37%
1983-1988	-6.86%	-7.64%	-10.19%
1989-1992	-1.72%	-1.15%	-3.14%

Source: Department of Defense, Office of the Comptroller of DoD, Congressional Action on FY 19XX Authorization Request, 1983-1992.

Department of Defense, Office of the Comptroller of DoD, Congressional Action on FY 19XX Appropriation Request, 1983-1992.

D. SUMMARY.

A pattern is evident in the relationship between presidential request and congressional action on those requests over the ten years evaluated for the defense, procurement and RDT&E budgets. In the FY 1983 to FY 1988 period, the authorization cycle significantly reduced the request, with another smaller reduction occurring during the appropriation cycle. The changes effected by the authorization process are greater than the changes made during appropriations.

Between FY 1989 and FY 1992, the changes made by Congress were much smaller than those made during the first period. And the typical pattern of large authorization cuts followed by smaller appropriations cuts is not applicable. During this period, the defense request was actually increased one year and during two of the remaining three the change to the request was less than one percent.

The fourth year, FY 1991, reflects a return to the pattern during FY 1983 to FY 1988. This year was influenced by the Budget Enforcement Act of 1990. The Budget Enforcement Act capped defense spending for the three year period, FY 1991 to FY 1993.

The defense caps were significantly below the Congressional Budget Office baseline, resulting in sharp drops in defense spending.

The procurement budget request was increased three of the four years during this period. Again, the fourth year, FY 1991, was affected by the Budget Enforcement Act of 1990. The RDT&E budget followed the more traditional pattern with only one year, FY 1992, being increased over the President's request.

The changes to the RDT&E budget were nearly two times larger than the reductions to the defense budget during FY 1983 to FY 1992. Between FY 1983 and FY 1988, RDT&E reductions averaged three times larger than defense reductions, while they were two times larger from FY 1989 to FY 1992.

The procurement budget reductions shifted throughout the FY 1983 to FY 1992 period. Overall, the procurement budget was trimmed slightly more than the defense budget. During FY 1983 to FY 1988, procurement was reduced by more than twice the size of the defense budget cuts. From FY 1989 to FY 1992, procurement was reduced less than the defense budget.

VI. CONGRESS AND THE RDT&E BUDGET: DIFFERENCES BETWEEN THE HOUSE AND SENATE

This chapter examines the difference between the House and Senate changes to the defense, procurement and RDT&E budgets. The purpose of this section is to determine whether there are appreciable differences, either quantitative or qualitative, between the two houses of Congress in terms of their treatment of the RDT&E budget.

A pattern is evident here. This pattern indicates that between FY 1983 and FY 1988 Congress made significant adjustments to the defense, procurement and RDT&E budget requests. Between FY 1989 and FY 1992, significantly smaller changes were made and, as a result, congressional oversight is more unpredictable during this period. This pattern in congressional oversight is consistent from the defense budget to procurement and RDT&E funding. This pattern also reveals that the Senate makes smaller reductions to the request as compared to the House and the Senate is more influential in the conference agreement.

A. THE DEFENSE BUDGET.

The topline defense budget, presidential request to final appropriation, was changed an average of -4.83 percent each year for the ten year period, FY 1983 to FY 1992. This is the total change to the budget as agreed to in the appropriations joint conference. In comparison, the average change to the defense budget by the House of Representatives, defined as the House-passed appropriations bill, for this period was -5.61 percent per year. The Senate averaged -4.23 percent per year for its changes from request to the Senate-passed appropriation bill during the same period. Notably, the conference committee agreed to a funding level between the House and Senate versions of the bill. Of the two

chambers, the Senate is slightly closer to the average change of the appropriation conference committee.

1. The House of Representatives.

From FY 1983 to FY 1992, the House averaged a reduction to the defense budget, request to appropriation, of -5.61 percent per year. The average change from request to authorization was -4.27 percent per year and -2.54 percent from the authorization to appropriation.

From FY 1983 to FY 1988, the average change was -8.37 percent per year from request to appropriation, while the average change from FY 1989 to FY 1992 was -1.46 percent per year. The changes in the first six years follow the pattern of being significantly higher than during the last four years. This pattern is also relevant to the request to authorization and the authorization to appropriation cycles.

The average change from request to authorization was -4.27 percent per year for the ten year period. From FY 1983 to FY 1988, the change was -5.94 percent per year and -1.78 percent per year from FY 1989 to FY 1992.

The authorization to appropriation changes averaged -2.54 percent per year for FY 1983 to FY 1992. The authorization was reduced 4.14 percent per year during the appropriation cycle from FY 1983 to FY 1988 and decreased 0.14 percent per year from FY 1989 to FY 1992.

In FY 1991, the changes to the defense budget were unusually large due to enactment of the Budget Enforcement Act of 1990. These changes were not consistent with the other three years of the FY 1989 to FY 1992 period.

Figure 5 displays the changes to the defense budget by the House. TABLE XVIII indicates the changes to the defense budget by the House and the Senate.

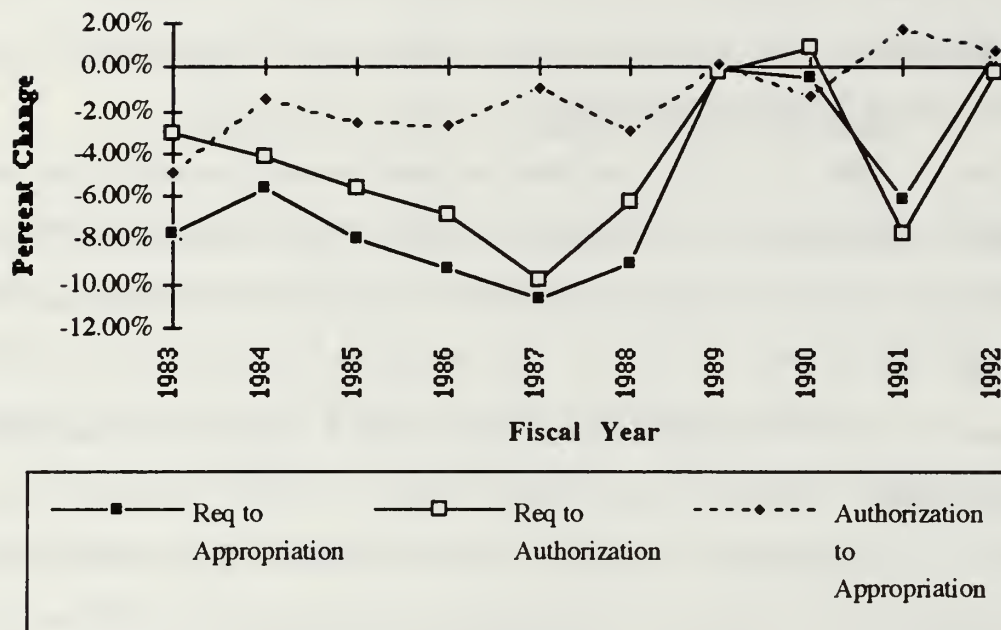


Figure 5
House Changes to the Defense Budget

Source: Department of Defense, Office of the Comptroller of DoD, Congressional Action on FY 19XX Authorization Request, 1983-1992.

Department of Defense, Office of the Comptroller of DoD, Congressional Action on FY 19XX Appropriation Request, 1983-1992.

2. The Senate.

The Senate averaged a -4.23 percent change per year to the defense budget, request to appropriation, from FY 1983 to FY 1992. From FY 1983 to FY 1988, the Senate averaged an a reduction of 5.72 percent per year to the defense budget, while the average reduction was -1.99 percent per year for FY 1989 to FY 1992.

The average change during the authorization cycle was -3.18 percent per year during the FY 1983 to FY 1992 period. The average change during the authorization cycle of the budget process from FY 1983 to FY 1988 was -4.29 percent per year, while the average change from FY 1989 to FY 1992 was -1.50 percent per year.

The average change from the authorization to appropriation was -1.09 percent for the FY 1983 to FY 1992 period. The change during the appropriation cycle between FY 1983 to FY 1988 period averaged -1.37 percent, while the next four year's averaged -0.68 percent per year. As indicated in the analysis of the House budget adjustments, FY 1991 is not characteristic of the FY 1989 to FY 1992 period due the Budget Enforcement Act of 1990.

The authorization to appropriation cycle in FY 1984 is uncharacteristic of the FY 1983 to FY 1988 period. In FY 1984, the Senate authorization bill reduced the request by 4.9 percent, slightly more than average for the FY 1983 to FY 1988 period. Then, the Senate-passed appropriation bill increased defense spending by 1.1 percent over the defense authorization bill passed by the House and Senate. This was the only time in the ten year evaluation period where the Senate increased defense funding over the authorization bill passed by the full House and Senate. Notably, the conference committee then agreed to a 0.15 percent reduction from the final authorization bill.

Figure 6 shows the changes to the defense budget by the Senate.

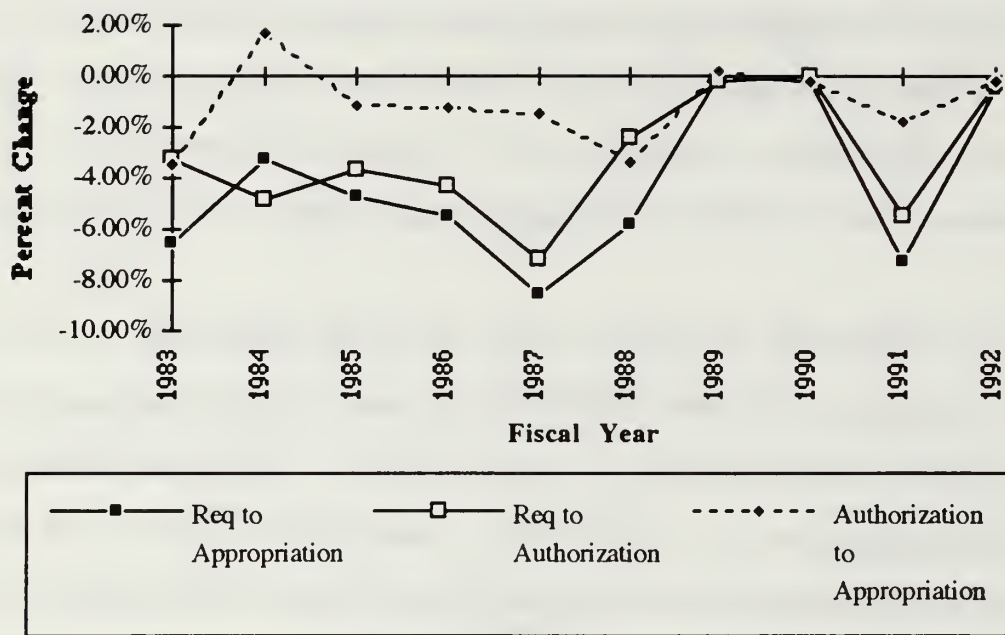


Figure 6
Senate Changes to the Defense Budget

Source: Department of Defense, Office of the Comptroller of DoD, Congressional Action on FY 19XX Authorization Request, 1983-1992.
 Department of Defense, Office of the Comptroller of DoD, Congressional Action on FY 19XX Appropriation Request, 1983-1992.

TABLE XVIII
DEFENSE HOUSE AND SENATE CHANGES

Fiscal Year	Request to Appropriation		Request to Authorization		Authorization to Appropriation	
	House	Senate	House	Senate	House	Senate
1983	-7.7%	-6.5%	-3.0%	-3.2%	-5.2%	-4.0%
1984	-5.6%	-3.2%	-4.1%	-4.9%	-1.3%	+1.1%
1985	-7.9%	-4.8%	-5.5%	-3.7%	-3.9%	-0.7%
1986	-9.3%	-5.5%	-6.8%	-4.3%	-5.5%	-1.6%
1987	-10.7%	-8.5%	-9.9%	-7.2%	-2.8%	-0.4%
1988	-9.0%	-5.7%	-6.3%	-2.4%	-6.1%	-2.7%
1989	0.0%	0.0%	-0.2%	-0.2%	-0.5%	-0.5%
1990	-0.4%	-0.2%	+0.9%	0.0%	-0.7%	-0.4%
1991	-6.1%	-7.2%	-7.7%	-5.5%	-0.2%	-1.5%
1992	+0.7%	-0.5%	-0.1%	-0.3%	+0.9%	-0.3%
1983-1992	-5.61%	-4.23%	-4.27%	-3.18%	-2.54%	-1.09%
1983-1988	-8.37%	-5.72%	-5.94%	-4.29%	-4.14%	-1.37%
1989-1992	-1.46%	-1.99%	-1.78%	-1.50%	-0.14%	-0.68%

Source: Department of Defense, Office of the Comptroller of DoD, Congressional Action on FY 19XX Authorization Request, 1983-1992.
Department of Defense, Office of the Comptroller of DoD, Congressional Action on FY 19XX Appropriation Request, 1983-1992.

3. The Results.

The defense budget was altered much more during the period between FY 1983 and FY 1988 than it was between the FY 1989 and FY 1992 period. Over the ten year period, the House averaged greater changes to the defense budget than the Senate. During

the second period, the trend was reversed and the Senate averaged greater changes to the defense budget. This comparison is from the request to the appropriation. The trend of the House making greater changes was reversed in FY 1991 and FY 1992. For these two years, the Senate made larger cuts to the budget than the House. Prior to these two years, the House had made greater cuts every year from request to appropriation during the ten years evaluated.

The Senate typically makes smaller reductions in the authorization cycle, as compared to the House. The Senate cuts averaged one percent less than the House over the ten year period. The Senate reductions average 1.6 percent less than the House reductions in the FY 1983 to FY 1988 period, while the reductions are within 0.3 percent for the subsequent four year period.

The House and Senate changes are important in understanding the changes from the presidential request to the final appropriation. The results of the conference committee are a crucial step in the budget process. TABLE XIX shows the House and Senate changes from the request to authorization, request to appropriation and the conference committee results of the two stages in the budget process. The table indicates that the authorization conference committee usually sided with the Senate version of the defense authorization bill and the appropriation conference committee usually sided with the House version of the appropriation bill.

The authorization conference committee has been closer to the Senate six out of the ten years evaluated. The conference committee average for the ten years is within .01 percent of the Senate average. For the FY 1983 to FY 1988 period, the House reductions are above the conference results, while the Senate is below. This is essentially true for the ten year period although the Senate and conference results are virtually the same.

The appropriation conference committee has been closer to the House version of the appropriation bill seven of the ten years evaluated, while closer to the Senate

adjustments in only two years, FY 1988 and FY 1992. However, the conference committee's average change to the defense budget for the ten year period is 0.58 percent above the Senate version of the bill and 0.80 percent below the House version. The conference committee changes for the FY 1983 to FY 1988 period averaged -6.86 percent per year, 1.14 percent higher than the Senate's six year average. The conference committee was 1.51 lower than the House's version of the appropriation bill. The conference agreement average is between the two versions from the chambers of Congress, but slightly closer to the Senate Appropriations Committee average.

During the FY 1989 to FY 1992 period, the appropriation conference committee changes are equidistant between the House and Senate. This period has the smallest range of changes from House to Senate as compared to the first six years and the ten year evaluation period. The range for FY 1989 to FY 1992 is 0.53 percent, as compared to 2.65 percent for the FY 1983 to FY 1988 period and 1.38 percent for the ten year evaluation period.

This data suggests that the Senate is more supportive of defense spending than the House, and somewhat more effective in getting its views enacted in conference agreements. For FY 1989 to FY 1992, the pattern disappears, as this period is more unpredictable as compared to the first period.

TABLE XIX
DEFENSE HOUSE, SENATE AND CONFERENCE CHANGES

Fiscal Year	Request to Authorization			Request to Appropriation		
	House	Senate	Conference	House	Senate	Conference
1983	-3.0%	-3.2%	-2.7%	-7.7%	-6.5%	-7.3%
1984	-4.1%	-4.9%	-4.3%	-5.6%	-3.2%	-4.5%
1985	-5.5%	-3.7%	-4.1%	-7.9%	-4.8%	-6.5%
1986	-6.8%	-4.3%	-4.0%	-9.3%	-5.5%	-7.9%
1987	-9.9%	-7.2%	-8.2%	-10.7%	-8.5%	-9.7%
1988	-6.3%	-2.4%	-3.1%	-9.0%	-5.7%	-5.4%
1989	-0.2%	-0.2%	+0.4%	0.0%	0.0%	+0.2%
1990	+0.9%	0.0%	+0.3%	-0.4%	-0.2%	-0.6%
1991	-7.7%	-5.5%	-5.8%	-6.1%	-7.2%	-6.5%
1992	-0.1%	-0.3%	-0.2%	+0.7%	-0.5%	-0.2%
1983-1992	-4.27%	-3.18%	-3.17%	-5.61%	-4.23%	-4.81%
1983-1988	-5.94%	-4.29%	-4.40%	-8.37%	-5.72%	-6.86%
1989-1992	-1.78%	-1.50%	-1.33%	-1.46%	-1.99%	-1.72%

Source: Department of Defense, Office of the Comptroller of DoD, Congressional Action on FY 19XX Authorization Request, 1983-1992.
Department of Defense, Office of the Comptroller of DoD, Congressional Action on FY 19XX Appropriation Request, 1983-1992.

Figure 7 shows the House, Senate and conference committee results for their respective versions of the defense authorization bill over the ten year evaluation period. The conference committee averaged changes closer to the Senate authorization committee's version of the bill, while remaining between the two chambers of Congress seven out of

the ten years evaluated. The exceptions are FY 1983, FY 1986 and FY 1989, when the conference committee increased funding over both the House and Senate versions of the authorization bill.

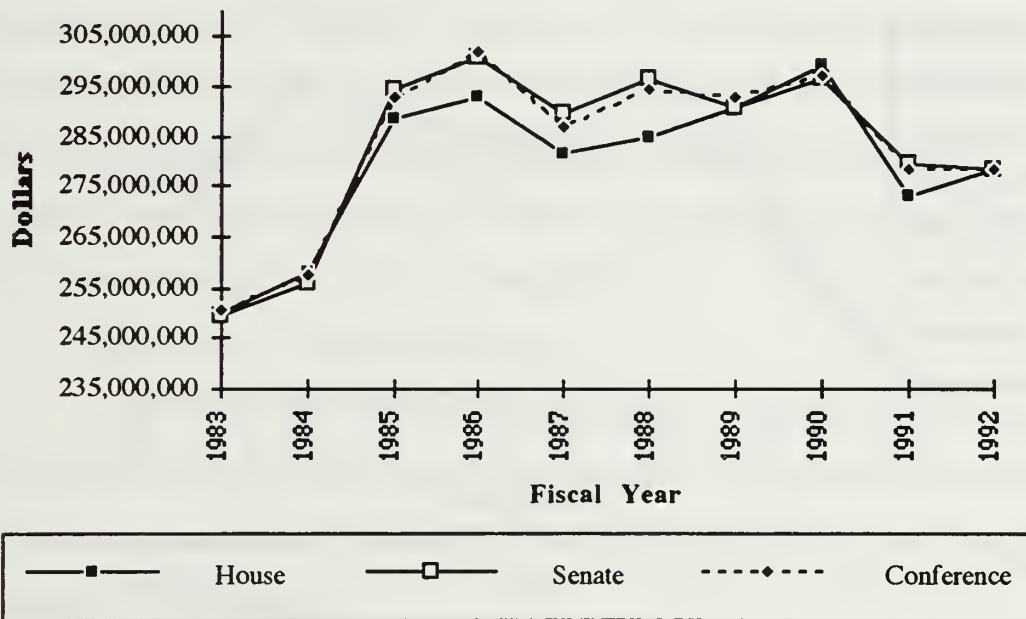


Figure 7
Defense Authorization for the House, Senate and Conference Committee
 (Current Dollars in Thousands)

Source: Department of Defense, Office of the Comptroller of DoD, Congressional Action on FY 19XX Authorization Request, 1983-1992.
 Department of Defense, Office of the Comptroller of DoD, Congressional Action on FY 19XX Appropriation Request, 1983-1992.

Figure 8 displays the House, Senate and conference committee versions of the defense appropriations bill. The conference committee has generally been equidistant between the House and Senate versions of the appropriation bill. The final version of the

appropriation bill, resolved in conference, was higher than both the House and Senate versions of the bill in FY 1988 and FY 1989. In FY 1990, the final appropriation bill was slightly lower than the other two versions of the bill.

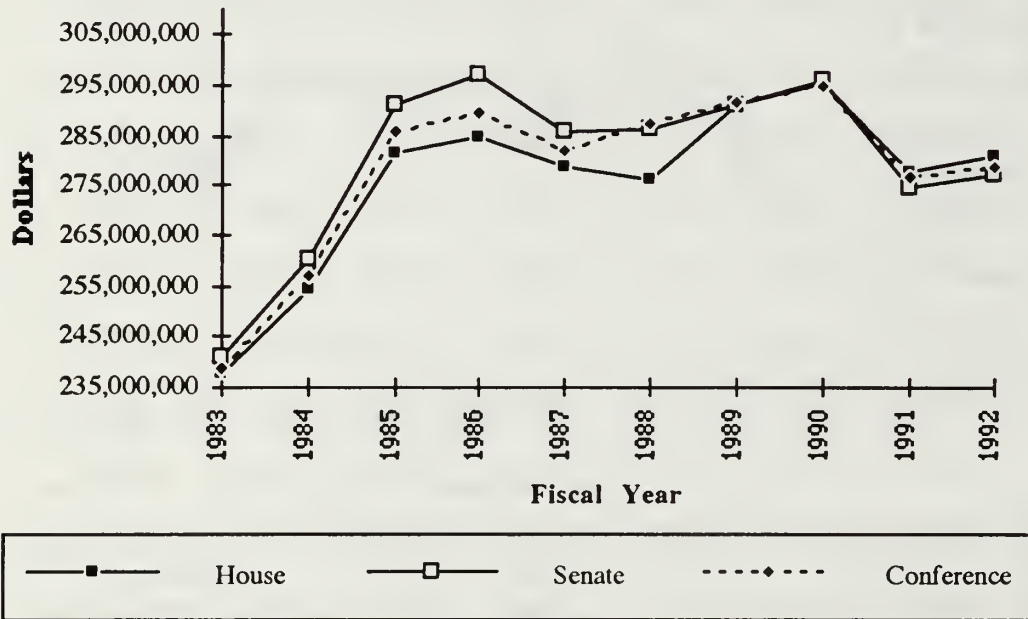


Figure 8
Defense Appropriations for the House, Senate and Conference Committee
 (Current Dollars in Thousands)

Source: Department of Defense, Office of the Comptroller of DoD, Congressional Action on FY 19XX Authorization Request, 1983-1992.
 Department of Defense, Office of the Comptroller of DoD, Congressional Action on FY 19XX Appropriation Request, 1983-1992.

B. THE PROCUREMENT BUDGET.

The average reduction to the procurement budget, request to appropriation, averaged 5.02 percent each year for the ten year period, FY 1983-FY 1992. These changes are from the request to the final appropriation bill. The change to the procurement budget by the

House of Representatives for this period averaged -7.62 percent per year. The Senate averaged -4.30 percent per year from request to appropriation during the same period. TABLE XX addresses the cuts to the three budget cycles by the House and Senate.

Like the defense budget, the changes to the procurement budget were higher from FY 1983 to FY 1988 as compared to the FY 1989 to FY 1992 period. The changes to the procurement budget from FY 1989 to FY 1992 were smaller and, occasionally, funding was increased over the Presidential request. And like defense, Senate funding was consistently higher than the House for the ten year period and the FY 1983 to FY 1988 period and for both authorizations and appropriations. Then the pattern dissolves.

Similar to the defense pattern, the changes from authorization to appropriation are smaller than the changes from request to authorization.

1. The House of Representatives.

From FY 1983 to FY 1992, the House averaged a reduction of -7.62 percent per year to the procurement budget, request to appropriation. During this period, the change from request to authorization averaged -6.92 percent per year and -3.71 percent from the authorization to appropriation.

From FY 1983 to FY 1988, the changes averaged -11.46 percent per year from request to appropriation, while the changes from FY 1989 to FY 1992 dropped dramatically, to -1.87 percent per year. The changes from FY 1983 to FY 1988 are consistently larger than during the FY 1989 to FY 1992 period.

The change from request to authorization averaged -6.92 percent per year. The request to authorization changes averaged -8.85 percent per year from FY 1983 to FY 1988 and less than half of that, at -4.04 percent per year from FY 1989 to FY 1992.

The authorization to appropriation changes averaged -3.71 percent per year for the FY 1983 to FY 1992 period. The authorization was reduced 6.24 percent per year

during the House appropriations cycle from FY 1983 to FY 1988 and increased 0.09 percent per year from FY 1989 to FY 1992.

The House took consistently larger cuts during all three budget cycles for the FY 1983 to FY 1988 period, then the pattern disappears and the two chambers are similar in terms of the size of their budget reductions. And the majority of the changes from request to appropriation are accounted for by cuts in the authorization cycle.

Like the defense budget, the changes to the procurement budget in FY 1991 were unusually large due to the Budget Enforcement Act of 1990. These changes are not characteristic of the changes of the other three years of the FY 1989 to FY 1992 period.

Figure 9 shows the changes to the procurement budget by the House. TABLE XX indicates the changes to the procurement budget by the House and the Senate.

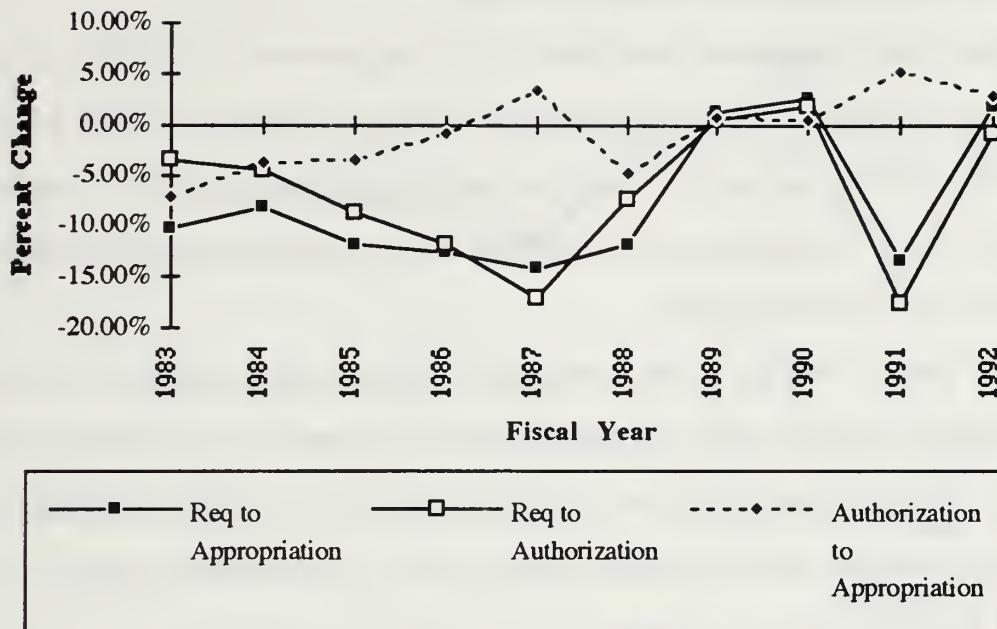


Figure 9
House Changes to the Procurement Budget

Source: Department of Defense, Office of the Comptroller of DoD, Congressional Action on FY 19XX Authorization Request, 1983-1992.
Department of Defense, Office of the Comptroller of DoD, Congressional Action on FY 19XX Appropriation Request, 1983-1992.

2. The Senate.

The Senate appropriations cycle averaged a -4.30 percent change per year to the procurement budget request from FY 1983 to FY 1992. From FY 1983 to FY 1988, the Senate averaged a reduction of 5.94 percent per year to the procurement budget, while the average reduction dropped to 1.84 percent per year for FY 1989 to FY 1992.

The average change from request to authorization was -5.26 percent per year during the FY 1983 to FY 1992 period. The average change to this stage in the budget

process from FY 1983 to FY 1988 was -6.00 percent per year while the average change was -4.14 percent per year from FY 1989 to FY 1992.

The average change from authorization to appropriation was -0.26 percent for the FY 1983 to FY 1992 period. The average change to this stage during the FY 1983 to FY 1988 period was -0.43 percent while the next four years average change was +0.01 percent per year. The FY 1991 changes are not characteristic of the congressional budget changes during the FY 1989 to FY 1992 period.

The Senate, like the House, made consistently larger reductions to the procurement budget in the FY 1983 to FY 1988 period as compared to the FY 1989 to FY 1992 period. Like the defense budget, the Senate consistently made smaller reductions in the first six years than the House reductions. During the next four years, this pattern is not as predicable between the House and Senate.

Figure X displays the changes to the procurement budget by the Senate. TABLE XX indicates the changes to the procurement budget by the House and the Senate.

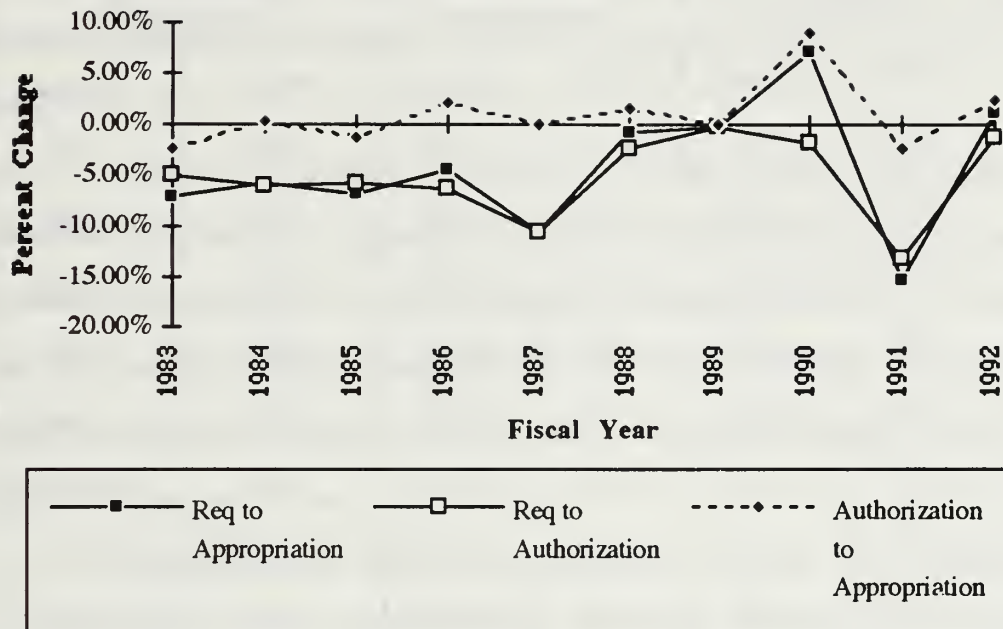


Figure 10
Senate Changes to the Procurement Budget

Source: Department of Defense, Office of the Comptroller of DoD, Congressional Action on FY 19XX Authorization Request, 1983-1992.
 Department of Defense, Office of the Comptroller of DoD, Congressional Action on FY 19XX Appropriation Request, 1983-1992.

TABLE XX
PROCUREMENT HOUSE AND SENATE CHANGES

Fiscal Year	Request to Appropriation		Request to Authorization		Authorization to Appropriation	
	House	Senate	House	Senate	House	Senate
1983	-10.4%	-7.0%	-3.5%	-4.9%	-7.0%	-3.5%
1984	-8.1%	-5.9%	-4.5%	-6.1%	-3.6%	-1.2%
1985	-11.8%	-7.0%	-8.7%	-5.8%	-6.0%	-0.9%
1986	-12.5%	-4.5%	-11.9%	-6.4%	-8.2%	+0.2%
1987	-14.3%	-10.6%	-17.2%	-10.6%	-3.5%	+0.6%
1988	-11.7%	-0.7%	-7.3%	-2.3%	-9.1%	+2.2%
1989	+1.3%	-0.3%	+0.4%	+0.4%	-0.4%	-1.9%
1990	+2.6%	+7.1%	+2.0%	+2.0%	-1.4%	+2.9%
1991	-13.3%	-15.2%	-17.8%	-13.2%	+0.2%	-2.0%
1992	+2.0%	-1.0%	-0.8%	-1.4%	+1.9%	+1.0%
1983-1992	-7.62%	-4.30%	-6.92%	-5.26%	-3.71%	-0.26%
1983-1988	-11.46%	-5.94%	-8.85%	-6.00%	-6.24%	-0.43%
1989-1992	-1.87%	-1.84%	-4.04%	-4.14%	+0.09%	+0.01%

Source: Department of Defense, Office of the Comptroller of DoD, Congressional Action on FY 19XX Authorization Request, 1983-1992.

Department of Defense, Office of the Comptroller of DoD, Congressional Action on FY 19XX Appropriation Request, 1983-1992.

3. The Results.

Cuts in the procurement budget were substantially greater during the period between FY 1983 and FY 1988 than they were in the FY 1989 to FY 1992 period. Over the ten year period, the House proposed larger cuts to the procurement budget than did the Senate. From FY 1989 to FY 1992, the House and Senate changes to the budget were

virtually identical from request to appropriation and request to authorization. The difference in the request to appropriations change averaged only 0.03 percent per year, while the difference in the request to authorization changes averaged a mere 0.1 percent per year.

TABLE XXI displays the House and Senate changes from the request to authorization and request to appropriation, along with the conference committee results. The table shows that until FY 1988, the Senate funding was higher than the House during both cycles of the budget process, and that both the authorization and appropriation conference committees usually resolved the respective versions of the two bills closer to the Senate version.

The authorization conference committee has been closer to the Senate five of the ten years evaluated. The conference average for the ten years is 1.17 percent below the average for the Senate during the same time period and 2.83 percent above the House average. Notably, the conference committee resolved the two versions of the authorization bill by cutting less than either the House or the Senate proposed.

The appropriation conference committee has been closer to the Senate adjustments in four of the ten years, while the House was closer five of the ten years. The remaining year was virtually even. The ten year average reduction to the procurement budget from the appropriations conference committee is 0.74 percent greater than the Senate changes and 2.58 percent less than the House ten year average. The conference committee cuts for the FY 1983 to FY 1988 period averaged -7.63 percent per year, 1.69 percent above the Senate and 3.83 percent below the House.

During the FY 1989 to FY 1992 period, the appropriation conference committee changes are equidistant between the House and Senate or slightly closer to the House figure. This period has the smallest range of procurement changes from the House to the

Senate. The range for FY 1989 to FY 1992 is 0.03 percent as compared to 5.52 percent for the FY 1983 to FY 1988 and 3.32 percent period for the ten year evaluation period.

TABLE XXI
PROCUREMENT HOUSE, SENATE AND CONFERENCE CHANGES

Fiscal Year	Request to Authorization			Request to Appropriation		
	House	Senate	Conference	House	Senate	Conference
1983	-3.5%	-4.9%	-3.6%	-10.4%	-7.0%	-9.9%
1984	-4.5%	-6.1%	-4.7%	-8.1%	-5.9%	-6.6%
1985	-8.7%	-5.8%	-6.2%	-11.8%	-7.0%	-9.7%
1986	-11.9%	-6.4%	-4.7%	-12.5%	-4.5%	-8.8%
1987	-17.2%	-10.6%	-11.2%	-14.3%	-10.6%	-11.3%
1988	-7.3%	-2.3%	-2.9%	-11.7%	-0.7%	+0.5%
1989	+0.4%	+0.4%	+1.6%	+1.3%	-0.3%	+0.5%
1990	+2.0%	+2.0%	+4.0%	+2.6%	+7.1%	+6.8%
1991	-17.8%	-13.2%	-13.5%	-13.3%	-15.2%	-13.1%
1992	-0.8%	-1.4%	+0.1%	+2.0%	-1.0%	+1.2%
1983-1992	-6.92%	-5.26%	-4.09%	-7.62%	-4.30%	-5.04%
1983-1988	-8.85%	-6.00%	-5.52%	-11.46%	-5.94%	-7.63%
1989-1992	-4.04%	-4.14%	-1.94%	-1.87%	-1.84%	-1.15%

Source: Department of Defense, Office of the Comptroller of DoD, Congressional Action on FY 19XX Authorization Request, 1983-1992.
Department of Defense, Office of the Comptroller of DoD, Congressional Action on FY 19XX Appropriation Request, 1983-1992.

Figure XI shows the House, Senate and conference committee results for the procurement provisions of the defense authorization bills over the ten year evaluation period. The conference committee averaged changes closer to the Senate authorized figure than to the House and remained between the two chambers of Congress six out of the ten years evaluated. The exceptions include FY 1986, FY 1989, FY 1990 and FY 1992, where the conference committee increased funding over both the House and Senate versions of the authorization bill.

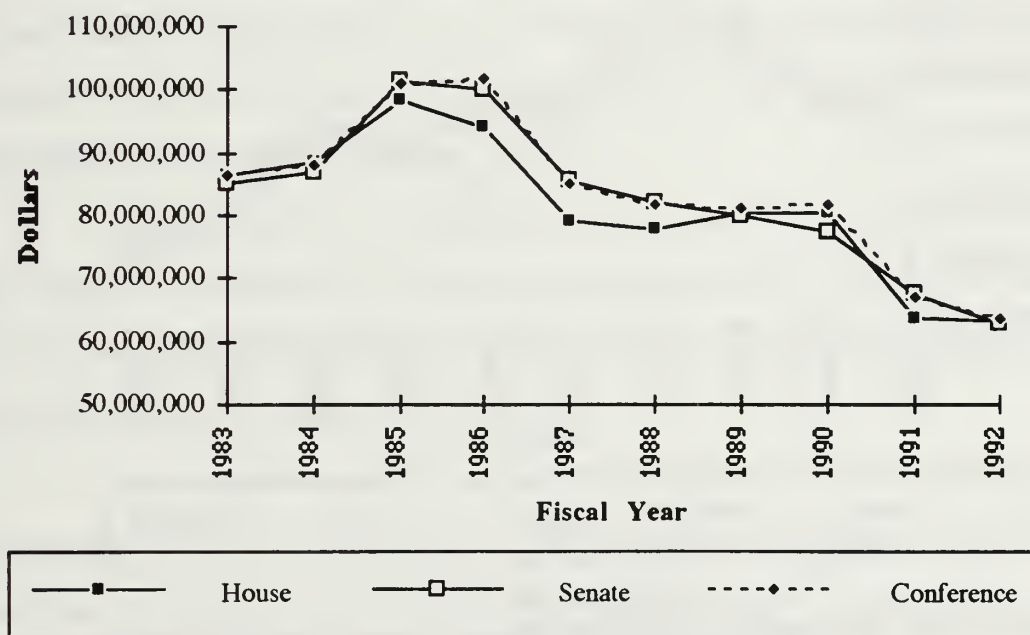


Figure 11
Procurement Authorization for the House, Senate and Conference
Committee
 (Current Dollars in Thousands)

Source: Department of Defense, Office of the Comptroller of DoD, Congressional Action on FY 19XX Authorization Request, 1983-1992.
 Department of Defense, Office of the Comptroller of DoD, Congressional Action on FY 19XX Appropriation Request, 1983-1992.

Figure 12 displays the House, Senate and conference committee versions of the defense appropriation bill. The conference committee has typically been equidistant between the House and Senate versions of the appropriation bill. The final version of the appropriation bill was higher than the House and Senate versions in FY 1988 and FY 1991.

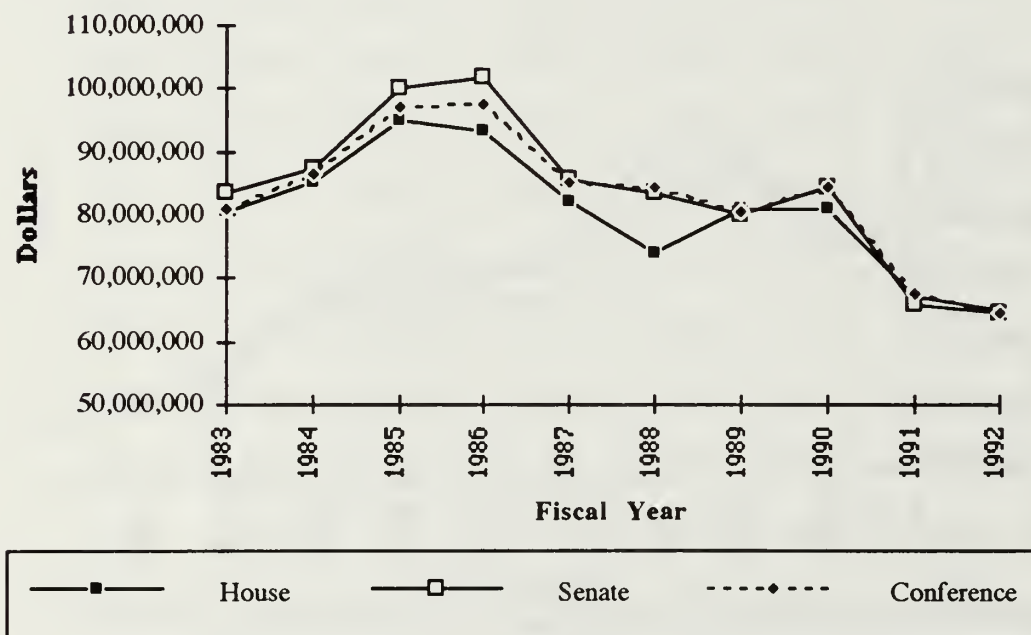


Figure 12
Procurement Appropriation for the House, Senate and Conference Committee
 (Current Dollars in Thousands)

Source: Department of Defense, Office of the Comptroller of DoD, Congressional Action on FY 19XX Authorization Request, 1983-1992.
 Department of Defense, Office of the Comptroller of DoD, Congressional Action on FY 19XX Appropriation Request, 1983-1992.

C. THE RDT&E BUDGET.

The final RDT&E budget, request to appropriation, was changed an average of -7.46 percent each year for the ten year period, FY 1983-FY 1992. This is the total change to the budget from Presidential request to final appropriation resolved in the appropriations joint conference. The average change to the RDT&E budget by the House of Representatives for this period is -10.77 percent per year. The Senate averaged -7.30 percent per year for their changes from request to appropriation during the same period. TABLE XXII shows the budget adjustments for the three budget cycles for both the House and Senate.

1. The House of Representatives.

From FY 1983 to FY 1992, the House averaged a reduction to the RDT&E budget, request to appropriation, of -10.77 percent per year. The average change from request to authorization was -8.14 percent per year and -5.89 percent for the average authorization to appropriation change.

From FY 1983 to FY 1988, the average change was -13.13 percent per year from request to appropriation, while the average change from FY 1989 to FY 1992 was -7.23 percent per year. Again, the changes in the first six years follow the pattern of being noticeably higher than during the last four years.

The average change from request to authorization was -8.14 percent per year. The change was -12.55 percent per year from FY 1983 to FY 1988 and -1.53 percent per year from FY 1989 to FY 1992. Notably, the cuts between FY 1983 and FY 1988 are more than eight times larger than they are between FY 1989 and FY 1992.

The authorization to appropriation changes averaged -5.89 percent per year between FY 1983 and FY 1992. The authorization was reduced 6.22 percent per year during the appropriations cycle from FY 1983 to FY 1988 and reduced 5.39 percent per year from FY 1989 to FY 1992.

In FY 1991, the Budget Enforcement Act of 1990 did not have as great an effect on the RDT&E budget as in the defense and procurement budgets. The changes to the RDT&E budget for FY 1991 were consistent with the other three years of the FY 1989 to FY 1992 period.

Figure 13 shows the changes to the RDT&E budget by the House. TABLE XXII indicates the changes to the RDT&E budget by the House and the Senate.

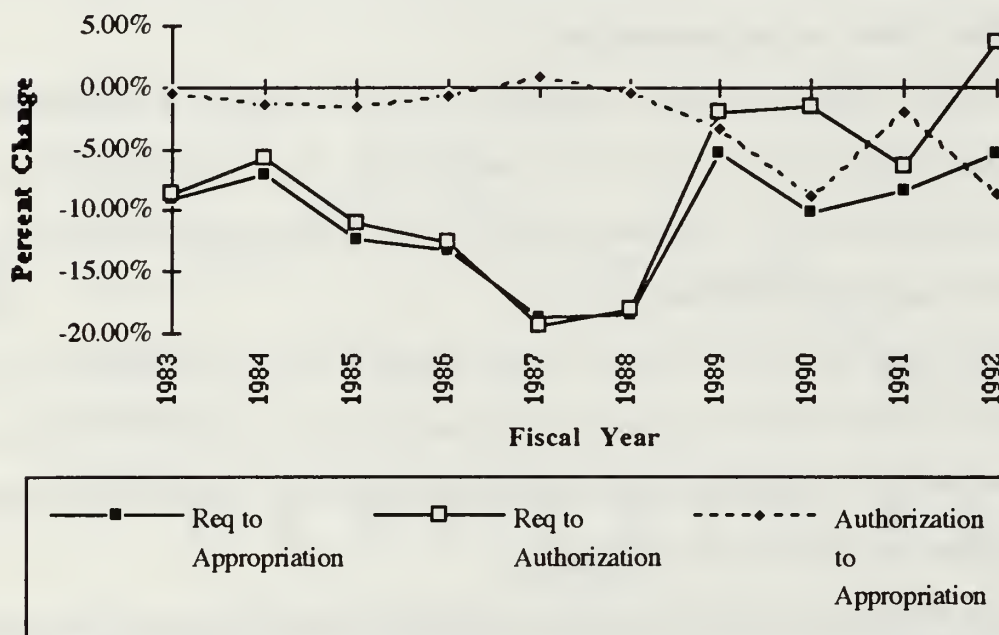


Figure 13
House Changes to the RDT&E Budget

Source: Department of Defense, Office of the Comptroller of DoD, Congressional Action on FY 19XX Authorization Request, 1983-1992.

Department of Defense, Office of the Comptroller of DoD, Congressional Action on FY 19XX Appropriation Request, 1983-1992.

2. The Senate.

The Senate averaged a -7.30 percent change per year to the RDT&E budget from FY 1983 to FY 1992, from presidential request to Senate appropriation. From FY 1983 to FY 1988, the Senate averaged a reduction of 8.96 percent per year to the RDT&E budget, while the reduction dropped to -4.82 percent per year for FY 1989 to FY 1992.

The average change from request to authorization was -4.17 percent per year during the FY 1983 to FY 1992 period. The average change to this stage in the budget process from FY 1983 to FY 1988 was -6.73 percent per year, while the average change from FY 1989 to FY 1992 was only -0.33 percent per year.

The average change from the authorization to appropriation was -2.18 percent for the FY 1983 to FY 1992 period. The average change to this stage during the FY 1983 to FY 1988 period was -1.66 percent while the next four years averaged -2.97 percent per year. This is the only time in any period where a chamber in Congress averaged greater changes to the FY 1989 to FY 1992 period as compared to the FY 1983 to FY 1988 period.

Figure 14 displays the changes to the RDT&E budget by the Senate. TABLE XXII indicates the changes to the RDT&E budget by the House and the Senate.

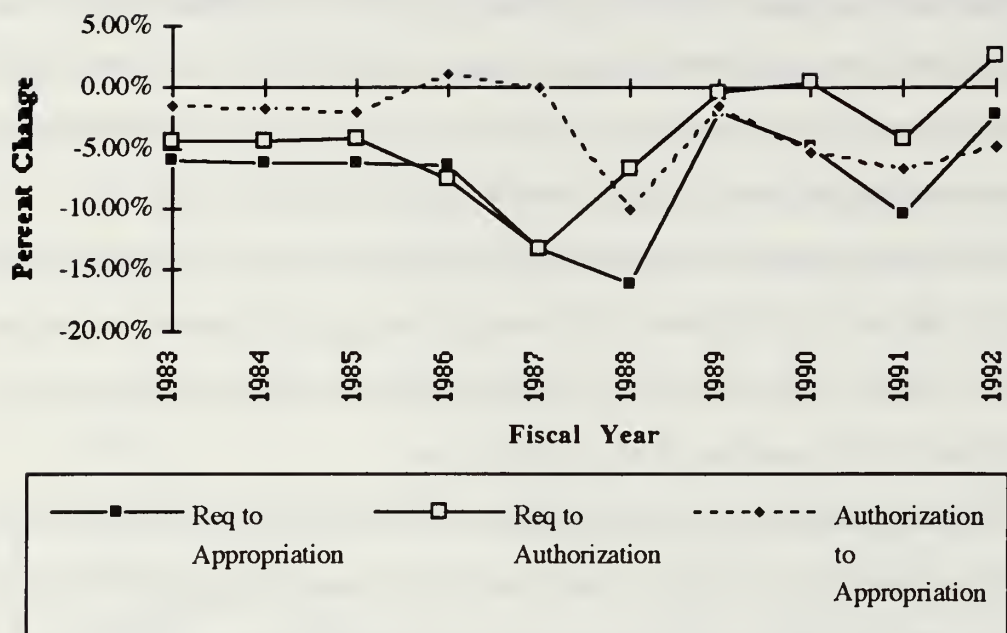


Figure 14
Senate Changes to the RDT&E Budget

Source: Department of Defense, Office of the Comptroller of DoD, Congressional Action on FY 19XX Authorization Request, 1983-1992.
 Department of Defense, Office of the Comptroller of DoD, Congressional Action on FY 19XX Appropriation Request, 1983-1992.

TABLE XXII
RDT&E HOUSE AND SENATE CHANGES

Fiscal Year	Request to Appropriation		Request to Authorization		Authorization to Appropriation	
	House	Senate	House	Senate	House	Senate
1983	-9.0%	-5.9%	-8.6%	-4.4%	-3.6%	-0.3%
1984	-7.1%	-6.1%	-5.8%	-4.4%	-3.1%	-2.0%
1985	-12.4%	-6.1%	-11.0%	-4.2%	-7.2%	-0.6%
1986	-13.3%	-6.5%	-12.6%	-7.5%	-5.5%	+1.8%
1987	-18.7%	-13.2%	-19.4%	-13.3%	-5.8%	+0.5%
1988	-18.4%	-16.0%	-17.9%	-6.7%	-12.0%	-9.4%
1989	-5.3%	-1.9%	-2.1%	-0.4%	-4.8%	-1.5%
1990	-10.1%	-4.8%	-1.5%	+0.5%	-6.3%	-0.7%
1991	-8.3%	-10.4%	-6.4%	-4.1%	-3.2%	-5.4%
1992	-5.2%	-2.2%	+3.8%	+2.7%	-7.2%	-4.2%
1983-1992	-10.77%	-7.30%	-8.14%	-4.17%	-5.89%	-2.18%
1983-1988	-13.13%	-8.96%	-12.55%	-6.73%	-6.22%	-1.66%
1989-1992	-7.23%	-4.82%	-1.53%	-0.33%	-5.39%	-2.97%

Source: Department of Defense, Office of the Comptroller of DoD, Congressional Action on FY 19XX Authorization Request, 1983-1992.
Department of Defense, Office of the Comptroller of DoD, Congressional Action on FY 19XX Appropriation Request, 1983-1992.

3. The Results.

The RDT&E budget was altered more between FY 1983 and FY 1988 than during the FY 1989 to FY 1992 period. Over the ten year period, the House averaged significantly greater changes to the RDT&E budget than the Senate.

TABLE XXIII shows the House and Senate changes from the request to authorization and request to appropriation along with the conference committee results. The table indicates that the Senate consistently cut less than the House and that the authorization and appropriation conference committees usually resolved the differences between the House and Senate versions of the bills by providing budgets closer to the Senate numbers. This pattern is less evident between FY 1989 and FY 1992 than during the first six years of the ten year period.

The authorization conference committee has been closer to the Senate nine of the ten years evaluated. The average for the ten years is 1.03 percent less than the average for the Senate during the same period and 2.94 percent per year more than the average House authorization bill.

The appropriation conference committee has been closer to the Senate Appropriations Committee adjustments in eight of the ten years. The ten year average change to the RDT&E budget by the conference committee is 0.16 percent below the Senate average and 3.31 percent above the House ten year average. The Senate has apparently been very effective in conference committee action on their portion of the defense bill, particularly in the FY 1983 to FY 1988 period.

The conference committee changes for the FY 1983 to FY 1988 period averaged -10.17 percent per year, within 1.21 percent of the Senate. During the FY 1989 to FY 1992 period, the conference committee changes averaged -3.14 percent per year. The Senate cuts were 1.68 percent greater than the conference committee, while the House cuts averaged 4.05 percent more than the conference committee.

TABLE XXIII
RDT&E HOUSE, SENATE AND CONFERENCE CHANGES

Fiscal Year	Request to Authorization			Request to Appropriation		
	House	Senate	Conference	House	Senate	Conference
1983	-8.6%	-4.4%	-5.5%	-9.0%	-5.9%	-6.9%
1984	-5.8%	-4.4%	-4.2%	-7.1%	-6.1%	-6.2%
1985	-11.0%	-4.2%	-5.6%	-12.4%	-6.1%	-8.2%
1986	-12.6%	-7.5%	-8.2%	-13.3%	-6.5%	-10.0%
1987	-19.4%	-13.3%	-13.6%	-18.7%	-13.2%	-14.6%
1988	-17.9%	-6.7%	-7.2%	-18.4%	-16.0%	-15.1%
1989	-2.1%	-0.4%	-0.5%	-5.3%	-1.9%	-1.3%
1990	-1.5%	+0.5%	-4.1%	-10.1%	-4.8%	-6.2%
1991	-6.4%	-4.1%	-5.2%	-8.3%	-10.4%	-5.6%
1992	+3.8%	+2.7%	+2.1%	-5.2%	-2.2%	-0.5%
1983-1992	-8.14%	-4.17%	-5.20%	-10.77%	-7.30%	-7.46%
1983-1988	-12.55%	-6.73%	-7.39%	-13.13%	-8.96%	-10.17%
1989-1992	-1.53%	-0.33%	-1.91%	-7.23%	-4.82%	-3.14%

Source: Department of Defense, Office of the Comptroller of DoD, Congressional Action on FY 19XX Authorization Request, 1983-1992.
Department of Defense, Office of the Comptroller of DoD, Congressional Action on FY 19XX Appropriation Request, 1983-1992.

Figure 15 shows the House, Senate and conference committee results for the defense authorization bills over the ten year evaluation period. The conference committee averaged changes closer to the Senate authorization bill than to the House version and remained between the two chambers of Congress seven out of the ten years evaluated. The

exceptions include FY 1984, FY 1990 and FY 1992. In FY 1984, the conference committee increased funding over the House and Senate versions of the authorization bill. The conference committee decreased funding from both the House and Senate versions of the authorization bill in FY 1990 and FY 1992.

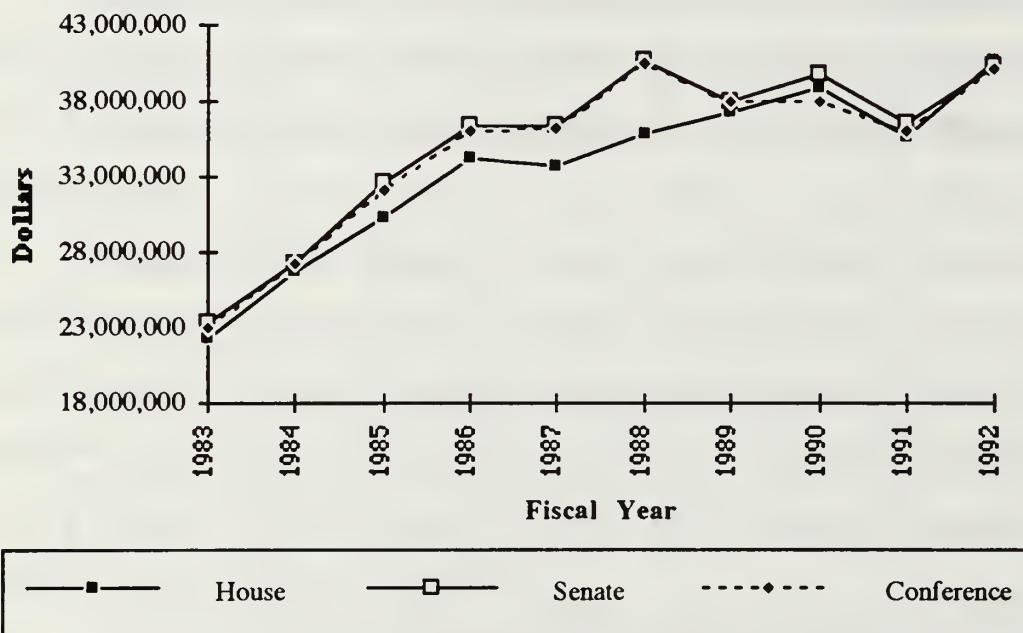


Figure 15
RDT&E Authorization for the House, Senate and Conference Committee
 (Current Dollars in Thousands)

Source: Department of Defense, Office of the Comptroller of DoD, Congressional Action on FY 19XX Authorization Request, 1983-1992.
 Department of Defense, Office of the Comptroller of DoD, Congressional Action on FY 19XX Appropriation Request, 1983-1992.

Figure 16 displays the House, Senate and conference committee versions of the defense appropriation bill. The conference committee generally has been equidistant between the House and Senate versions of the appropriation bill. The final version of the

appropriation bill has been higher than the House and Senate versions in FY 1988, FY 1989, FY 1991 and FY 1992.

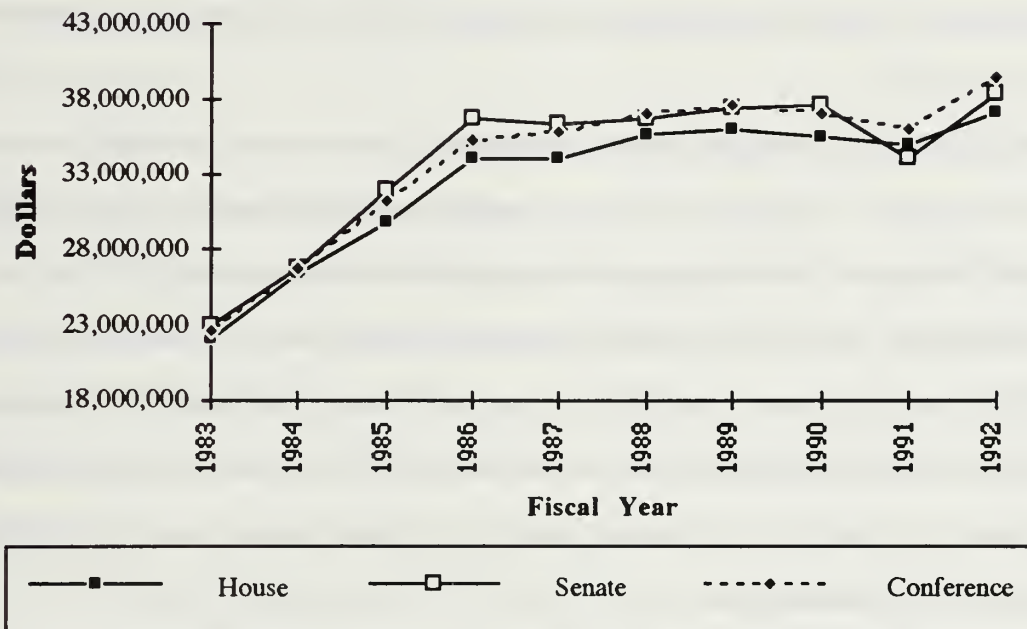


Figure 16
RDT&E Appropriation for the House, Senate and Conference Committee
 (Current Dollars in Thousands)

Source: Department of Defense, Office of the Comptroller of DoD, Congressional Action on FY 19XX Authorization Request, 1983-1992.
 Department of Defense, Office of the Comptroller of DoD, Congressional Action on FY 19XX Appropriation Request, 1983-1992.

D. SUMMARY.

A pattern was evident in analyzing the changes made to the defense, procurement and RDT&E budgets. The decade must first be divided into two distinct periods. The first is from FY 1983 to FY 1988 and the second is from FY 1989 to FY 1992. The pattern was

evident in the first period, but in the second period the pattern dissolved and the period was more unpredictable.

The FY 1983 to FY 1988 period is characterized by larger and more consistent changes relative to the second period. Both periods have larger changes from request to authorization as compared to authorization to appropriation. The reasons for this were noted in chapter five.

The FY 1989 to FY 1992 period was more unpredictable. However, several common themes were present. The changes were much smaller as compared to the first period. The House and Senate were much closer together in passing their respective bills. The trend, evident between FY 1983 and FY 1988, of increasingly large cuts to defense, procurement and RDT&E was not present in any of the budget cycles during this period. The defense, procurement, and RDT&E budgets each received the smallest reduction during some cycle of this period. The chambers of Congress agreed which budget should receive the smallest cut during two of the three cycles.

In general, the Senate makes smaller budget reductions than the House. This is true for the ten year period and between FY 1983 to FY 1989. During the FY 1989 to FY 1992 period, the House and Senate changes are smaller and similar in budget reduction. For defense and procurement, the House and Senate changes are within on half of one percent of each other, i.e., virtually equal. For RDT&E, the budget cuts aren't as close, but they are relatively closer than the ten year period and the FY 1983 to FY 1988 period.

The Senate has been more successful than the House in getting its view enacted in the conference committees. For the ten year period and the FY 1983 to FY 1988 period, the Senate is closer to the conference results for defense, procurement and RDT&E. During the FY 1989 to FY 1992 period, the pattern dissolves and the period is more unstable.

1. FY 1983 to FY 1992.

During the ten years evaluated, the Senate averaged smaller changes to the budget than the House. This applies to all three budgets, defense, procurement and RDT&E. Changes in this context mean cuts to the President's request. Hence, the Senate has been more supportive of Presidential defense budget requests than the House during this six year period.

Both the House and the Senate made larger changes during the authorization cycle than during the appropriations cycle.

The House changes to defense, request to appropriation, averaged -5.61 percent per year; however, the procurement changes were -7.62 percent per year and RDT&E averaged -10.77 percent per year. The changes to RDT&E were higher than procurement and almost twice the size of the changes to defense, while procurement was slightly higher than defense.

The House adjustments from request to authorization were similar to the changes from request to appropriation. The only difference is the quantity of changes. The changes to defense were -4.27 percent per year while the procurement changes averaged -6.92 percent while the RDT&E funding changes were -8.14 percent per year.

The authorization to appropriation phase also followed the same pattern as the other two budget cycles. The defense changes were -2.54 percent per year while the procurement changes were -3.71 percent per year and -5.89 percent per year for RDT&E. The RDT&E change is twice the defense changes, while the procurement changes are slightly higher than the changes to the defense budget.

The Senate request to appropriation cycle followed this same pattern, specifically, RDT&E changes were greater than procurement changes, which, in turn, were larger than changes to defense budget totals. The request to appropriations changes were -4.23 percent per year for defense while the procurement changes were -4.30 percent per

year and RDT&E changes were -7.30 percent per year. The order is the same as is the case with the House, but the differences are smaller.

The request to authorization changes were closer in proportion, but not in the normal pattern. The sequence was defense, RDT&E and procurement. The defense reductions averaged 3.18 percent. RDT&E was one percent larger than defense at 4.17 percent, while procurement was two percent larger than the average defense budget reduction at 5.26 percent.

The authorization to appropriation changes were -1.09 percent per year for defense, while the procurement changes were -0.26 and -2.18 for RDT&E. These, again, do not follow the tradition pattern. The procurement budget was reduced less than the defense budget, while RDT&E was cut twice as much as the defense reduction.

During the ten year period, the conference committees resolved the two versions of the authorization bill closer to the Senate's version of the bill the majority of the time. This is true for defense, procurement and RDT&E. For defense, the conference committee was closer to the Senate version seven out of the ten years. For procurement, the conference committee was closer to the Senate five out of the ten years and for RDT&E, eight out of ten years.

During the ten year period, the appropriation conference committee results averaged closer to the Senate for defense, procurement and RDT&E. For procurement, the conference committees resolved the bill closer to the Senate version five out of the ten years and for RDT&E, eight out of ten years. However, final appropriations for defense were closer to the Senate version only two out of the ten years. Of the remaining eight years, the conference committee was closer to the House's version of the bill seven times and virtually even the remaining year. Notice, the Senate version, on average, was closer to the conference results, while evaluating each year individually, the House was closer to the conference results more often.

TABLE XXIV displays the defense, procurement and RDT&E averages for the House and Senate for this period and the two sub-sets of the ten year period.

TABLE XXIV
SUMMARY OF HOUSE AND SENATE BUDGET CHANGES

	FY 1983 to FY 1992					
	Defense		Procurement		RDT&E	
	House	Senate	House	Senate	House	Senate
Request to Appropriation	-5.61%	-4.23%	-7.62%	-4.30%	-10.77%	-7.30%
Request to Authorization	-4.27%	-3.18%	-6.92%	-5.26%	-8.14%	-4.17%
Authorization to Appropriation	-2.54%	-1.09%	-3.71%	-0.26%	-5.89%	-2.18%
	FY 1983 to FY 1988					
Request to Appropriation	-8.37%	-5.72%	-11.46%	-5.94%	-13.13%	-8.96%
Request to Authorization	-5.94%	-4.29%	-8.85%	-6.00%	-12.55%	-6.73%
Authorization to Appropriation	-4.14%	-1.37%	-6.24%	-0.43%	-6.22%	-1.66%
	FY 1989 to FY 1992					
Request to Appropriation	-1.46%	-1.99%	-1.87%	-1.84%	-7.23%	-4.82%
Request to Authorization	-1.78%	-1.50%	-4.04%	-4.14%	-1.53%	-0.33%
Authorization to Appropriation	-0.14%	-0.68%	+0.09%	+0.01%	-5.39%	-2.97%

Source: Department of Defense, Office of the Comptroller of DoD, Congressional Action on FY 19XX Authorization Request, 1983-1992.
Department of Defense, Office of the Comptroller of DoD, Congressional Action on FY 19XX Appropriation Request, 1983-1992.

2. FY 1983 to FY 1988.

This period is characterized by large reductions to each of the budgets. The defense budget was cut the least, with proportionately greater reductions taken in procurement and RDT&E. The other common theme during this period is that the Senate made smaller reductions than the House.

The House reduced the defense budget by an average of 8.37 percent over the six year period, while the procurement reduction averaged 11.46 percent per year and 13.13 percent per year was the average reduction for RDT&E. This follows the pattern of increasing reductions in defense, procurement and RDT&E. The authorizing committee averaged a 5.94 percent per year reduction to the request for defense, while procurement averaged -8.85 percent per year and -12.55 percent per year for RDT&E. The cuts in RDT&E funding were over twice as large as the reduction in the defense budget, while procurement was cut by 3.00 percent more than defense.

During the House appropriations cycle, defense typically was reduced less than during the authorization cycle. This is true for defense, procurement and RDT&E segments of the appropriation bill. During the appropriations cycle, defense was reduced by 4.14 percent per year from the final authorization bill, while procurement received a 6.24 percent per year reduction and RDT&E was cut 6.22 percent per year.

The Senate reduced the defense request by 5.72 percent per year, which represented the total changes to the budget, request to appropriation. Procurement was reduced 5.94 percent per year and RDT&E was reduced 8.96 percent per year from request to appropriation. The normal pattern holds, as procurement was reduced slightly more than the total defense budget while RDT&E was cut significantly more than the defense budget.

For defense, the Senate authorization cycle reduced the request by 4.29 percent per year, while procurement averaged a 6.00 percent per year reduction and RDT&E

averaged a reduction of 6.73 percent per year. This follows the sequence of increasingly greater reductions to defense, procurement and RDT&E.

The Senate appropriation cycle reduced the authorization bill by 1.37 percent per year for defense. Procurement averaged only 0.43 percent per year reduction and RDT&E averaged a reduction of 1.66 percent per year. As in defense, this pattern is different from the normal pattern. The Senate appropriation cycle reduced the total defense budget more than procurement, while the RDT&E reduction was only slightly higher than overall defense.

During this period, the conference committees averaged changes more in line with the Senate version for the defense, procurement and RDT&E budgets. Although the House appropriations level for the defense bill was closer to the conference committee resolution five of the six years during this period, the conference average was still closer to the Senate's average for the period. In FY 1988, when the Senate was closer to the final resolution, the agreement was great enough to pull the Senate's average closer to the conference committee's average for the period.

For procurement and RDT&E, the Senate was closer to the conference committee resolution at least half the time. For RDT&E, the Senate authorization and appropriation bills were closer to the conference committee results every year except FY 1986, when the House appropriation number was closer to the conference results.

3. FY 1989 to FY 1992.

The last four years of the ten year evaluation period indicate a shift in congressional oversight patterns. Prevalent characteristics of this period include smaller reductions to the President's request, smaller differences between the House and Senate, and noticeably smaller cuts in procurement funding.

The House reduced the defense budget by an average of 1.46 percent over the four year period, while the procurement reduction averaged 1.87 percent per year and 7.23

percent per year was the average for RDT&E. This follows the pattern evident in the FY 1983 to FY 1988 period. However, the total reduction to RDT&E was approximately five times larger than the reduction for defense during this period, as compared to almost twice as large as the defense cuts in the FY 1983 to FY 1988 period.

The House authorization bills cut the request by an average of 1.78 percent per year for defense, while procurement averaged 4.04 percent per year and RDT&E averaged only 1.53 percent per year. RDT&E was reduced less than the defense budget, while procurement received a cut twice the defense reduction.

The House appropriation bills typically made smaller reductions to each budget from the final authorization as compared to the first six years. The appropriations bills reduced defense by 0.14 percent per year from the final authorization bill. Procurement received a 0.09 percent per year increase and RDT&E received a 5.39 percent per year reduction. During this period, the House made small reductions to the defense budget, increased the procurement budget and cut RDT&E ten times more than it cut the defense budget.

The Senate appropriations bills reduced the defense request by 1.99 percent per year over the period FY 1989 to FY 1992. Procurement was reduced slightly less at 1.84 percent per year, while RDT&E was reduced significantly more--4.82 percent per year from request to appropriation. Procurement was reduced slightly less than the total defense budget reduction, while RDT&E was over three times greater than the defense budget reduction.

For defense, the Senate authorizations bills reduced the request by 1.50 percent per year, while procurement averaged a 4.14 percent per year reduction and RDT&E averaged a 0.33 percent per year reduction. These changes are significant, in that they show the priority the Senate Armed Services Committee places on RDT&E. The changes to RDT&E funding are a third of the changes to the defense budget.

The Senate appropriators reduced the authorization bill by 0.68 percent per year for defense. Procurement averaged a 0.01 percent per year increase and RDT&E averaged a reduction of 2.97 percent per year. The reduction sequence is different from the normal pattern, but typical for the Senate appropriation cycle for the ten year period, the FY 1983 to FY 1988 period and the FY 1989 to FY 1992 period. The reduction sequence indicates that the level of priority on RDT&E for the Senate Appropriations Committee is less than the priority in the Senate Armed Services Committee. This is indicated by the Senate Armed Services Committee reduction of RDT&E funding, request to authorization, by 0.33 percent for this period, by far the smallest reduction to any of the budgets. On the other hand, the Senate Appropriations Committee reduced the RDT&E authorization by 2.97 percent for this period, four times larger than the defense and procurement budgets. The 5.39 percent reduction to the RDT&E authorization by the House Appropriations Committee was nearly forty times larger than the defense and procurement budgets.

During this period, the conference committees were equidistant from the House and Senate for the defense and procurement budgets. The authorization conference committees for the defense budget averaged changes within one half of one percent of the two chambers of Congress. The average authorization bill resulted in a smaller reduction than proposed by either of the two chambers.

The appropriations conference committees resolved the versions of the defense bill at a funding level equidistant from the House and Senate bills. For procurement, the appropriations conference committee resolved the different versions by funding the budget more than either chamber's bill. The House and Senate bills were very close to the same average reduction to the procurement budget, while the conference reduction was 0.7 percent less than either chamber. The House reductions averaged 1.87 percent, the Senate procurement reductions averaged 1.84 percent and the conference agreement resulted in 1.15 percent reduction.

The congressional changes to the RDT&E budget are different than the other budgets. The authorizations conference committees cut more from the RDT&E budget than either of the two chambers of Congress. The result was a funding level lower than the House version of the RDT&E budget, which typically reduced the budget by the largest amount, and lower than the Senate version of the bill. The House authorization bill reduced RDT&E by 1.53 percent, while the Senate reduced the request by 0.33 percent. The conference resolved the respective bills with a 1.91 percent reduction.

The appropriation conference committee cut the RDT&E budget less than either of the two chambers. The result was a funding level greater than the Senate version of the RDT&E budget, which typically makes smaller reductions to the budget. The House-passed appropriations bill mandated a 7.23 percent reduction in RDT&E spending, while the Senate version reduced RDT&E by 4.82 percent. The conference agreement resolved the two bill by reducing RDT&E spending by 3.14 percent.

VII. CONCLUSION

This chapter is divided into three parts. First, the changes to the defense, procurement and RDT&E budgets over the past decade are summarized. Second, the key conclusions are drawn. Third, suggestions for further study are offered.

A. CHANGES TO THE DEFENSE AND INVESTMENT BUDGETS.

The changes to defense budgets have exhibited a distinct pattern during the FY 1983 to FY 1992 evaluation period. This pattern reflects certain priorities within the congressional oversight process. This pattern is very evident during the FY 1983 to FY 1988 period, while during the FY 1989 to FY 1992 period, the pattern is dissolved. This second period displays unstable trends, but priorities are still evident.

1. The First Period: FY 1983 to FY 1988.

This period is characterized by large reductions during the congressional authorization cycle to the defense, procurement and RDT&E budgets. The appropriations cycle followed with much smaller reductions to these budgets. The changes made during this period are much larger than the changes made during the second period. The changes to the defense budget were smaller than the changes made to the procurement and RDT&E budgets. Within the investment budget, procurement was reduced the least.

The two houses of Congress displayed some additional trends during this period. The Senate made smaller adjustments to the defense, procurement and RDT&E budgets, as compared to the House. The conference committee usually come closer to agreeing with the Senate version of the authorization and appropriation bill for procurement and RDT&E. For defense, the conference authorization committee usually agreed with the

Senate bill, while the conference appropriation bill for defense was closer to the House bill the majority of the time.

The House and Senate authorization bills agreed to average reductions of 4.40 percent, 5.52 percent and 7.39 percent of the defense, procurement and RDT&E budgets, respectively. Clearly, the authorization reduction to the Presidential request is not equally distributed to all three budgets. Procurement averaged a reduction slightly higher than defense, while the cut in RDT&E funding was nearly twice the defense cut.

The authorization reductions were much larger than the appropriations reductions. The appropriations cycles reduced the budgets by 2.57 percent, 2.23 percent and 3.01 percent for defense, procurement and RDT&E, respectively. These budget reductions are smaller and sequenced differently than those effected by the authorizing committees. Procurement is the smallest reduction followed by defense and then RDT&E. All three budget reductions are similar in proportion and within one half of one percent of each other.

The topline changes to the President's request were larger this period than during the second period. These topline changes are from presidential request to final appropriation. The reductions averaged 6.86 percent, 7.64 percent and 10.19 percent for defense, procurement and RDT&E. The second period changes for defense, procurement and RDT&E are -1.72 percent, -1.15 percent and -3.14 percent, respectively. The first period reductions to the defense budget are four times larger than the second period, while the procurement reductions are six times larger and RDT&E reductions are three times larger as compared to the first period.

This period has significant differences between the House and Senate versions of the authorization and appropriation bills. During this period, the Senate always averaged lower reductions in the defense, procurement and RDT&E budgets. In some cases, the difference was substantial. In the request to authorization cycle, the House and Senate

differences were moderate for defense and procurement. The differences in these two budgets were two to three percent. For RDT&E, however, the House reduction was two times larger than the Senate.

House-Senate differences in the appropriation cycle were very large. The reductions in the House version of the appropriations bills were three times greater than the Senate levels for defense, fourteen times greater for procurement and four times greater for RDT&E.

Based on averages, the authorization and appropriations conference committees sided with the Senate the majority of the time on all three budgets. The Senate authorization bill was closer to the conference results four of six years for defense and procurement and six of six years for RDT&E. For appropriations, the Senate bill was closer to defense only one of six years, three of six years for procurement and five of six years for RDT&E. Thus, the House was closer more frequently to the conference results for defense and equally as often as the Senate for procurement.

2. The Second Period: FY 1989 to FY 1992.

This period is characterized by smaller changes as compared to the first period. These more modest reductions were in the same sequence as the first period, with the authorization committees making the larger cuts. The budget reductions to defense were not the smallest reductions of the three budget during this period. While defense received the smallest reduction in the first period, procurement took the smallest budget reduction during this period.

The House-Senate differences noted during the first period almost disappear during the second period, except as concerns the RDT&E budget. The House authorization cycle made reductions to RDT&E that were five times larger than the Senate authorization cycle. And the House appropriations bills reduced the RDT&E budget by twice the amount of the Senate appropriations bills.

The relative size of budget changes, as discussed in the previous section, was much smaller during this period. The changes were roughly one third as large as the changes made during the first period. These top line reductions from the request to the appropriation were 1.72 percent, 1.15 percent and 3.14 percent for defense, procurement and RDT&E.

The authorization committees agreed to reductions to the request of 1.33 percent, 1.94 percent and 1.91 percent of the defense, procurement and RDT&E budgets. These reductions are much closer in size to each other and much smaller than the previous period. The defense reduction was just over one half of one percent smaller than the other two budgets. The procurement and RDT&E budget reductions were virtually identical and significantly smaller than the reductions of the first period. The first period reduction to procurement and RDT&E were 5.52 percent and 7.39 percent, respectively. These first period changes were three and four times larger than the second period changes of 1.94 and 1.91 for procurement and RDT&E, as noted.

The House and Senate appropriations reductions were smaller than the authorization reductions and smaller than the previous period. The appropriations changes were -0.40 percent, +0.78 percent and -1.24 percent for defense, procurement and RDT&E. These changes are smaller than the authorization cuts and smaller than the appropriation cuts of 2.57 percent, 2.23 percent and 3.01 percent reductions for defense, procurement and RDT&E during the first period. The defense changes in the second period were a seventh the size of the first period, procurement averaged an increase over the authorization bill and the RDT&E reductions were half the size of the first period. The second period changes were in the identical order as the first period, with procurement being increased, defense second in its reduction and RDT&E the largest cut. This sequence of budget reductions was true only for the authorization to appropriation cycle.

The conference committees for authorization and appropriations are more evenly divided between House and Senate during this period. For defense, the conference authorization committee was closer to the Senate two of four years, while the two remaining years were equally divided between the two chambers. The appropriations conference committee sided with the House two of the four years with one evenly split and the last closer to the Senate results.

For procurement, the authorization conference results are exactly even, with two ties, and each chamber closer to the conference one year. The appropriations conference sided with the House twice, split evenly once, and the Senate was closer one year.

The conference results for RDT&E reveal that the Senate was closer three of the four years for both authorization and appropriation bills.

B. THE BOTTOM LINE.

Five conclusions can be drawn from the data presented in this thesis.

(1) The period between FY 1983 and FY 1988 saw significantly greater conflict between Congress and the executive branch over priorities regarding the defense budget. These differences are even more acute in the area of defense investment, i.e., funding for procurement and RDT&E. Congress averaged a relatively small cut to the President's defense budget during this period, averaged a larger cut to procurement as compared to defense and averaged even a larger cut to RDT&E. The House of Representatives was consistently more interested in reducing all three of these budgets than was the Senate. Final agreements between the two chambers were closer to Senate preferences.

These differences may be explained by several factors. Between 1982 and 1987, Secretary of Defense Casper Weinburger requested growth in defense budgets well above the inflation rate. This growth rate was for funding strategic modernization and expansion

plans. Congressional reductions to the defense budgets were viewed as temporary set backs by the Secretary of Defense. After each budget reduction by Congress, the next year's defense budget was trimmed at the margin, leaving the long range defense plans untouched. [Ref. 33:p. 183]

The deficit rose dramatically during this period, putting pressure on Congress to cut spending. The defense budget--the largest single discretionary appropriation--was not immune to this pressure. In 1985, Congress passed Gramm-Rudman-Hollings (GRH), legislation designed to force deficit reduction. The threat of sequestration, which would severely impact defense under the rules of GRH, increased incentives to reduce defense spending at the end of this period.

(2) The budget reductions were smaller during the FY 1989 to FY 1992 period. The data suggest greater cooperation between the President and Congress and between the two houses of Congress. The executive and congressional branches of government were more in line with each other in terms of budget priorities and deficit reduction goals.

A major part of the explanation for the apparent consensus between Congress and the executive branch, and between the House and Senate lies with summit agreements.

Two of the four years during this period--1988 and 1991 (FY 1989 and FY 1992)--represented the second year of major budget summit agreements. In 1988, the defense budget was essentially fixed as a result of the two year budget agreement reached the previous year. Congress completed its entire budget process according to its own schedule in 1988, only the third time this has happened since 1948. [Ref. 33:p 179]

In 1991, Congress again had a target for defense spending that had been previously negotiated with the administration. The FY 1992 defense budget was determined by the separate spending cap set for defense by the Budget Enforcement Act of 1990 (BEA). [Ref. 34:p. 4-5]

The fact that 1990 was different from the other three years of this period is also partly explained by the BEA. The five month conflict over budget priorities that preceded passage of the BEA was similar to the disagreements characteristic of the period between FY 1983 and FY 1988. The outcome of the conflict in 1990 was a five year plan to reduce the deficit through spending control. As in the first period, defense cuts figure prominently in this plan. These cuts are manifest in the unusually large congressional cut in the defense budget for FY 1991.

The second factor explaining the relative consensus on defense spending in this period can be found by examining the size of the presidential budget requests. During the FY 1983 to FY 1988 period, the presidential request increased RDT&E funding by 10.87 percent as compared to 3.09 percent for defense and -1.83 percent for procurement. During the second period from FY 1989 to FY 1992, the presidential request for RDT&E was more in line with the defense and procurement budgets. RDT&E funding requests averaged a 2.97 percent decrease from the previous year, while the defense request was 2.20 percent less than the previous year and procurement was 7.40 less. TABLE XXV displays these figures.

TABLE XXV
ANNUAL INCREASES IN PRESIDENTIAL BUDGET REQUESTS

	Defense	Procurement	RDT&E
FY 1983 to FY 1988	3.09%	-1.83%	10.87%
FY 1989 to FY 1992	-2.20%	-7.40%	-2.97%

Source: Department of Defense, Office of the Comptroller of DoD, Congressional Action on FY 19XX Authorization Request, 1983-1992.
Department of Defense, Office of the Comptroller of DoD, Congressional Action on FY 19XX Appropriation Request, 1983-1992.

This data suggests that Congress was responding to large changes in executive budget requests by modifying them during the first period, while during the second it made smaller adjustments because some of the cuts it supported had already been made in the request.

(3) The Senate is more supportive of RDT&E spending than is the House. This is true for both periods evaluated. Within the Senate, the Senate Appropriations Committee was the strongest RDT&E advocate during the first period, while during the second period the Senate Armed Services Committee was most supportive.

During the FY 1983 to FY 1988 period, the RDT&E budget was cut by an average of 12.55 percent by the House authorization bills, while the Senate cut only 6.73 percent during the same cycle.

The appropriations cycle accents the Senate's RDT&E support. The House appropriations bill reduced the authorization by an average of 6.22 percent, nearly four times that of the Senate appropriations bill. The Senate appropriations bill averaged a 1.66 percent reduction in the authorization.

During the FY 1989 to FY 1992 period, the reductions to RDT&E funding were less than that of the first period and the Senate was still the stronger RDT&E supporter. The RDT&E budget was cut by an average of 1.53 percent by the House authorization bills. The Senate authorization bills cut only 0.33 percent during this period.

The Senate's preferential treatment on RDT&E is also apparent in the appropriation cycle. During the period between FY 1989 and FY 1992, the House appropriation bills reduced RDT&E by an average of 5.39 percent, while the Senate bills averaged 2.97 percent.

TABLE XXVI displays the reductions to the RDT&E budget by the House and Senate during each of the budget cycles.

TABLE XXVI
RDT&E REDUCTIONS BY THE HOUSE AND SENATE

	FY 1983-FY 1988		FY 1989-FY 1992	
	House	Senate	House	Senate
Request to Appropriation	-13.13%	-8.96%	-7.23%	-4.82%
Request to Authorization	-12.55%	-6.73%	-1.53%	-0.33%
Authorization to Appropriation	-6.22%	-1.66%	-5.39%	-2.97%

Source: Department of Defense, Office of the Comptroller of DoD, Congressional Action on FY 19XX Authorization Request, 1983-1992.
Department of Defense, Office of the Comptroller of DoD, Congressional Action on FY 19XX Appropriation Request, 1983-1992.

(4) The appropriation for procurement was funded more than the presidential request three of the four years during the FY 1989 to FY 1992 period. The authorization was increased over the request in FY 1989, FY 1990 and FY 1992. And the appropriation was increased over the authorized level in two of these three years, FY 1990 and FY 1992. The third year, FY 1989, the appropriation was below the authorization, but above the initial request.

The only year during this period when funding was not increased over the request was FY 1991. This year the Budget Enforcement Act of 1990 was passed which resulted in uncharacteristic budget reductions for the period. However, even in FY 1991, the appropriation bill did increase funding over the authorization funding level. TABLE XXVII displays this raw data.

TABLE XXVII
PROCUREMENT FUNDING INCREASES FY 1989-FY 1992
(CURRENT DOLLARS IN THOUSANDS)

	1989	1990	1991	1992
Request	\$80,037,400	\$78,754,000	\$77,642,450	\$63,845,800
Authorization	\$81,340,979	\$81,929,489	\$67,184,710	\$63,884,659
Appropriation	\$80,402,042	\$84,113,159	\$67,469,348	\$64,639,407

Source: Department of Defense, Office of the Comptroller of DoD, Congressional Action on FY 19XX Authorization Request, 1983-1992.
Department of Defense, Office of the Comptroller of DoD, Congressional Action on FY 19XX Appropriation Request, 1983-1992.

Congressional moderation of requested cuts in the procurement budget suggests that Congress was delaying the effects of the defense build down in their respective states and districts by slowing the procurement budget reduction. This is a significant change in congressional oversight from the first period where procurement was reduced at the same rate as the defense budget. Also, the Armed Services Committees reduced the procurement budget at a slightly higher level than the defense budget and at the same reduction rate as RDT&E during the second period. On the other hand, the Appropriations Committees waived or ignored the authorization funding caps during the second period and increased the procurement budget to a higher level.

(5) The RDT&E budget has received the highest relative reductions during both the authorization and appropriation cycles. With only one slight exception in the authorization cycle during the FY 1989 to FY 1992 period, RDT&E received the largest cut of the three budgets during the authorization and appropriation process. TABLE XXVIII displays the authorization and appropriation budget reductions for defense, procurement and RDT&E.

TABLE XXVIII
AUTHORIZATION AND APPROPRIATION BUDGET
REDUCTIONS FOR DEFENSE, PROCUREMENT AND RDT&E

Fiscal Years	Request to Authorization			Request to Appropriation		
	Defense	Procurement	RDT&E	Defense	Procurement	RDT&E
1983-1992	-3.17%	-4.09%	-5.20%	-4.81%	-5.05%	-7.37%
1983-1988	-4.40%	-5.52%	-7.39%	-6.86%	-7.64%	-10.19%
1989-1992	-1.33%	-1.94%	-1.91%	-1.72%	-1.15%	-3.14%

Source: Department of Defense, Office of the Comptroller of DoD, Congressional Action on FY 19XX Authorization Request, 1983-1992.
Department of Defense, Office of the Comptroller of DoD, Congressional Action on FY 19XX Appropriation Request, 1983-1992.

The relative lack of priority may be a function of the fact that the RDT&E budgets are more abstract than procurement budgets, and are less related to individual congressional districts. Additionally, the RDT&E appropriation always remained below the authorization funding limit, unlike the procurement budget, during the ten year period. Therefore, Congressman are less likely to support RDT&E, unless they are directly involved in the national RDT&E effort as in the case of Senator Jeff Bingaman.

The RDT&E budget is difficult to define in exact dollar terms and being authorized and appropriated by line item leads to a subjective determination of required funding. On the other hand, procurement programs are relatively objective and consequently tougher to eliminate because the political pain is more apparent. Therefore, the RDT&E budget can be reduced without directly affecting exact output like procurement numbers or personnel.

C. SUGGESTIONS FOR FURTHER STUDY.

While the RDT&E budget may appear less politically salient than procurement to some in Congress, others find it increasingly relevant to both defense and domestic economic policy. These members of Congress, active within the defense committees, are focusing more attention on the RDT&E budget than has previously occurred. It would be useful to measure the extent of this interest by examining the kinds of changes that Congress is making to the RDT&E budget.

Congress may have cut RDT&E budgets more than it cut procurement and defense over the previous decade because RDT&E was seen as emblematic of strategic modernization. If so, it is likely that Congress will take a different view of this portion of the defense budget now that the Cold War is over and strategic modernization is no longer an important security objective. If economic issues have replaced defense issues on the national agenda, the effect should be noticeable within the changes that congress makes to the RDT&E budget.

It is possible to evaluate such changes by identifying those portions of the RDT&E budget that are most supported by Congress and those that receive the largest cuts. Support for defense RDT&E that is more closely linked to potential commercial purposes would be most evident in congressional support for those elements of the RDT&E budget that are primarily devoted to basic research, as opposed to weapons development. The data used for this research would permit an assessment of the kind of support.

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